LAO PEOPLE'S DEMOCRATIC REPUBLIC

PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY

MINISTRY OF PUBLIC WORKS AND TRANSPORT

DEPARTMENT OF ROADS

The Southeast Asia Regional Economic Corridor and Connectivity Project (P176088)

FEASIBILITY STUDY AND ENVIRONMENT AND SOCIAL ASSESSMENT (ESA) STUDY FOR IMPROVEMENT AND MAINTENANCE OF NATIONAL ROAD 2

National Road Climate Resilient Improvement and Maintenance in NR2

Environmental and Social Management Plan (ESMP)

-NR2W-

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ABBREVIATION AND ACRONYMS

Acronyms/Abbreviations	Definition
AADT	Average Annual Daily Traffic

Acronyms/Abbreviations	Definition
AASHTO	American Association of State Highway and Transportation Officials
ACM	Asbestos Containing Materials
ADB	Asian Development Bank
AHN	Asian Highway Network
AOI	Area of Influence
A-RAP	Abbreviated Resettlement Action Plan
ASEAN	Association of Southeast Asian Nations
AZE	Alliance for Zero Extinction
BAP	Borrow Pit Action Plan
BMP	Biodiversity Management Plan
BOD	Biological Oxygen Demand
BOQ	Bill of Quantities
CDC	Concept Design Consultants
CESMP	Contractors Environmental and Social Management Plan
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station data
CHS	Community Health and Safety
CITES	Convention on International Trade in the Endangered Species of Fauna and Flora
CMUs	Component Management Units
CO	Carbon Monoxide
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
COI	Corridor of Impact
CR	Critical
CVMP	Construction Vibration Management
DAFO	District of Agriculture and Forestry
DBST	Double Bituminous Surface Treatment
DD	Detailed Design
DDMCC	Department of Disaster Management and Climate Change
DEQP	Department of Environmental Quality Promotion
DFP	Department of Financial and Planning
DFRM	Department of Forest Resources Management
DMH	Department of Meteorology and Hydrology
DOA	Department of Organization and Administrative
DoE	Department of Environment
DoI	Department of Inspection
DoL	Department of Land
DoNREI	Department of Natural Resources and Environmental Inspection
DoR	Department of Roads
DoT	Department of Transport
DPC	Department of Planning and Cooperation
DPWT	Provincial Department of Public Works and Transport
DWR	Department of Water Resources
E&S	Environmental and Social
EA	Environmental Assessment

Acronyms/Abbreviations	Definition
EGEF	Ethnic Groups Engagement Framework
EGEP	Ethnic Group Engagement Plan
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ELV	Emissions Limits Values
EN	Endangered
ENSO	El Niño Southern Oscillation
EPL	Environmental Protection Law
ERP	Emergency Response Plan
ESCP	Environment and Social Commitment Plan
ESD-PTI	Environmental and Social Division of the Public Works and Transport Institute
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMMP	environmental and social management and mitigation plan
ESMP	Environmental and Social Management Plan
ESOM	Environmental and Social Operational Manual
ESS	Environmental and Social Standard
EU	European Union
FAO	Food and Agriculture Organization
FDF	Forest Development Fund
FS	Feasibility Study
GAP	Gender Action Plan
GBV	Gender Based Violence
GDP	Gross Domestic Product
GIIP	Good International Industry Practice
GOL	Government of Laos
GRM	Grievance Redress Mechanism
HC	Hydrocarbons
HPP	Hydropower Plant
IBA	Important Bird Area
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ISWS	Implementation Support and Works Supervision Consultant
IUCN	International Union for Conservation of Nature and Natural Resources
KBA	Key Biodiversity Areas
LCF	Local Consulting Firm
LFNC	Lao Front for National Construction
LFND	Lao Front for National Development
LHS	Left Hand Side
LMP	Labour Management Plan
MAC	Maximum Allowable Concentrations
MAF	Ministry of Agriculture and Forestry
MOF	Ministry of Finance

Acronyms/Abbreviations	Definition
MONRE	Ministry of Natural Resources and the Environment
MPAC	Master Plan for ASEAN Connectivity
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
MSDS	Material Safety Data Sheet
NBCA	National Biodiversity Conservation Areas
NDF	Nordic Development Fund
NEC	National Environmental Committee
NES	National Environmental Specialist
NGO	Non-governmental Organization
NMRCS	National Mekong River Commission Secretariat
NO	Nitrogen Oxide
NO2	Nitrogen Dioxide
NOX	Nitrogen Oxides
NPA	Nationally Protected Area
NR2E	National Road 2 East
NR2W	National Road 2 West
NRERI	Natural Resources and Environmental Research Institute
NSCC	National Strategy on Climate Change
O&M	Operation and Maintenance
OCHA	The Office for the Coordination of Humanitarian Affairs
OHS	Occupational Health and Safety
OP	Operational Policy
OPBRC	Output- and Performance-Based Road
OPWT	Office of Public Works and Transport
PAFO	Provincial Office of Agriculture and
PAFO	Provincial Office of Agriculture and Forestry
PAPs	Protected Areas
PCR	Physical Cultural Resources
PDO	Project Development Objective
PDR	Peoples Democratic Republic
PEC	A Provincial Environmental Committee
PFS	A pre-feasibility study
PKK	Phou Khao Khoay
PM	Particulate Matter
PM10	Particulate Matter less than 10 Microns
PMU	Project Management Unit
PONRE	Provincial Department of Natural Resources and Environment
PPE	Personal Protective Equipment
PPIAF	Public Private Infrastructure Advisory Facility
PPN	Phou Phanang
PPP	Public-private Partnership
PtFAs	Protection forestland areas
PTI	Public Works and Transport Institute
RAP	Resettlement Action Plan
RC	Resettlement Committee

Acronyms/Abbreviations	Definition
RHS	Right Hand Side
ROW	Right of Way
RPF	Resettlement Planning Framework
SEA/SH	Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
SIDA	Swedish International Development Cooperation Agency
SO2	Sulphur Dioxide
SO2	Sulphur dioxide
STD	Sexually Transmitted Disease
TMP	Traffic Management Plan
ToR	Terms of Reference
TSP	Total Suspended Particulate
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
UXO	Unexploded Ordnance
VAC	Violence Against Women
VU	Vulnerable
VUDAA	Vientiane Urban Development and Administration Authority
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WMP	Waste Management Plan

Units of Measurement

Unit	*Definition*
dB(A)	*Decibel, A-weighted*
Km	*Kilometer*
Km/h	*Kilometers per hour*
Laeq	*Equivalent Continuous Sound Pressure Level*
M	*Meter*
Mg/kg	*Milligrams per kilogram*
M3	*Cubic Meter*
m3/s	*Cubic Meters per Second*
Ppm	*Parts per million*
µg/m3	*Micrograms per cubic meter*

1. INTRODUCTION

This Environmental and Social Management Plan (ESMP) is part of the process of compliance with the World Bank Environmental and Social Framework (ESF) in relation to the Southeast Asia Regional Economic Corridor and Connectivity Project (SAERECC). The proposed SEARECC project will support the Government of Lao PDR (GoL) to improve regional and domestic trade and climate resilient transport connectivity along an East-West corridor in Southeast Asia, and to provide immediate and effective response in case of an Eligible Crisis or Emergency. It has five components:

- Component 1: Lao PDR and Regional connectivity enhancement;
- Component 2: Logistics services development and border-crossing management;
- Component 3: Strengthening institutional capacity and regulatory framework in agriculture, transport, and investments planning;
- Component 4: Project Management; and
- Component 5: Contingency Emergency Response.

This Project falls under Component 1. This subcomponent supports the improvement and maintenance of the climate resilience and safety of selected sections of NR2W[1] to meet the Asian Highway Class III standards. This includes widening of the road from 6 meters to 8 meters (6 meters of the carriageway and 2 meters of shoulders – 1 meter each side to accommodate pedestrian safety) and rest areas. The Output and Performance-Based Road Contracts (OPBRC), with three years for construction, for which the payments are based on completed road subsections, and seven years for operations and maintenance, for which the quarterly payments are made based on the fulfillment of the service level specified in the contract. The Department of Road (DOR), MPWT, will be the lead implementing agency for this subcomponent.

The Project Development Objectives (PDOs) are to improve regional and domestic trade and climate resilient transport connectivity along an east-west corridor in Southeast Asia, and to provide immediate and effective response in case of an Eligible Crisis or Emergency.

An Environmental and Social Impact Assessment (ESIA) study has been carried out to meet the environmental and social requirements of World Bank. Within the scope of ESIA studies, the Consultant has prepared an ESIA Package containing the following documents:

- Environmental and Social Impact Assessment (ESIA)
- Biodiversity Management Plan (BMP)
- Stakeholder Engagement Plan (SEP)
- Resettlement Action Plan (RAP)
- Labour Management Plan
- Gender Action Plan (GEP)

[1] The NR2E sections will be financed by EIB in parallel to this project.

- Environmental and Social Management Plan (ESMP)
- Ethnic Groups Engagement Plan (EGEP)

In the ESIA process, the necessary environmental and social risks and impacts arising from the Project have been assessed, and necessary measures have been introduced to manage impacts in accordance with national legislation, international standards and guidance documents, and through the adoption of good international industry practices. The ESIA Report consists of the following key components, each of which is described in detail:

- Description of the project
- Institutional and legal framework
- Environmental and social baseline
- Environmental and social impact assessment
- Analysis of alternatives

Environmental and Social Management Plan (ESMP), which is one of the documents submitted within the scope of the ESIA package, describes the measures and controls developed in line with the mitigation hierarchy for the management of the impacts identified during the ESIA process, determines the implementation schedule, roles and responsibilities, reporting and monitoring requirements. The mitigation and monitoring plans included in this ESMP, defines the environmental and social mitigation measures and management controls to be implemented in order to ensure compliance with the Project Standards presented under ESIA Report on relevant environmental and social issues.

MPWT and all contractors / sub-contractors are responsible for the implementation of the ESMP and the general principles presented within the scope of the ESMP, as well as for the implementation of more detailed plans and procedures.

1.1. Purpose and Scope

The purpose of ESMP is to provide the environmental and social management planned to be implemented within the scope of the Project, and to provide the necessary management tools to ensure compliance with the Project standards in achieving the environmental and social objectives set within the scope of ESIA. Besides the legal and institutional requirements for the successful implementation of the relevant management plans, ESMP also determines the roles and responsibilities of MPWT and the contractor / sub-contractors. The main objectives of ESMP are as follows:

- To provide an overview of the environment, health and safety (EHS), socio-economic and cultural heritage policies, standards and legal legislation that the Project is obliged to comply with.
- To provide guidance on how to manage EHS risks in the construction phase of the Project in compliance with EHS policies, standards and legal regulations and to ensure that Project commitments are fulfilled.
- To determine the roles and responsibilities of MPWT and contractors to ensure compliance with EHS requirements during the construction phase of the project.
- To ensure that construction activities are properly monitored to ensure that the Project is in compliance with EHS policies, standards and legal regulations.

- Ensure reporting systems are developed and streamlined to deliver EHS compliance performance.
- Enabling ongoing development and EHS compliance coverage.

1.2. Environmental and Social Management Plan Structure

Subjects covered within the scope of the ESMP are presented under the following chapters:

- **Introduction:** The section in-hand.
- **Project Description:** Summary information about project activities, duration and cost of the project.
- **Project Standards:** Summary of key national legislation and World Bank Group environmental, health and safety guidelines and standards EHS documents.
- **Implementation Plan:**
- **Mitigation Plan**: Provides the Project mitigation measures and the responsible parties for implementation.
- **Monitoring Plan:** Provides the Project E&S monitoring plans and responsibilities.

2. PROJECT DESCRIPTION

2.1. Location

NR2W section, 136km, consists of four districts as Muang Xai District, Houn District, Beng District and Pakbeng District in Oudomxay Province.

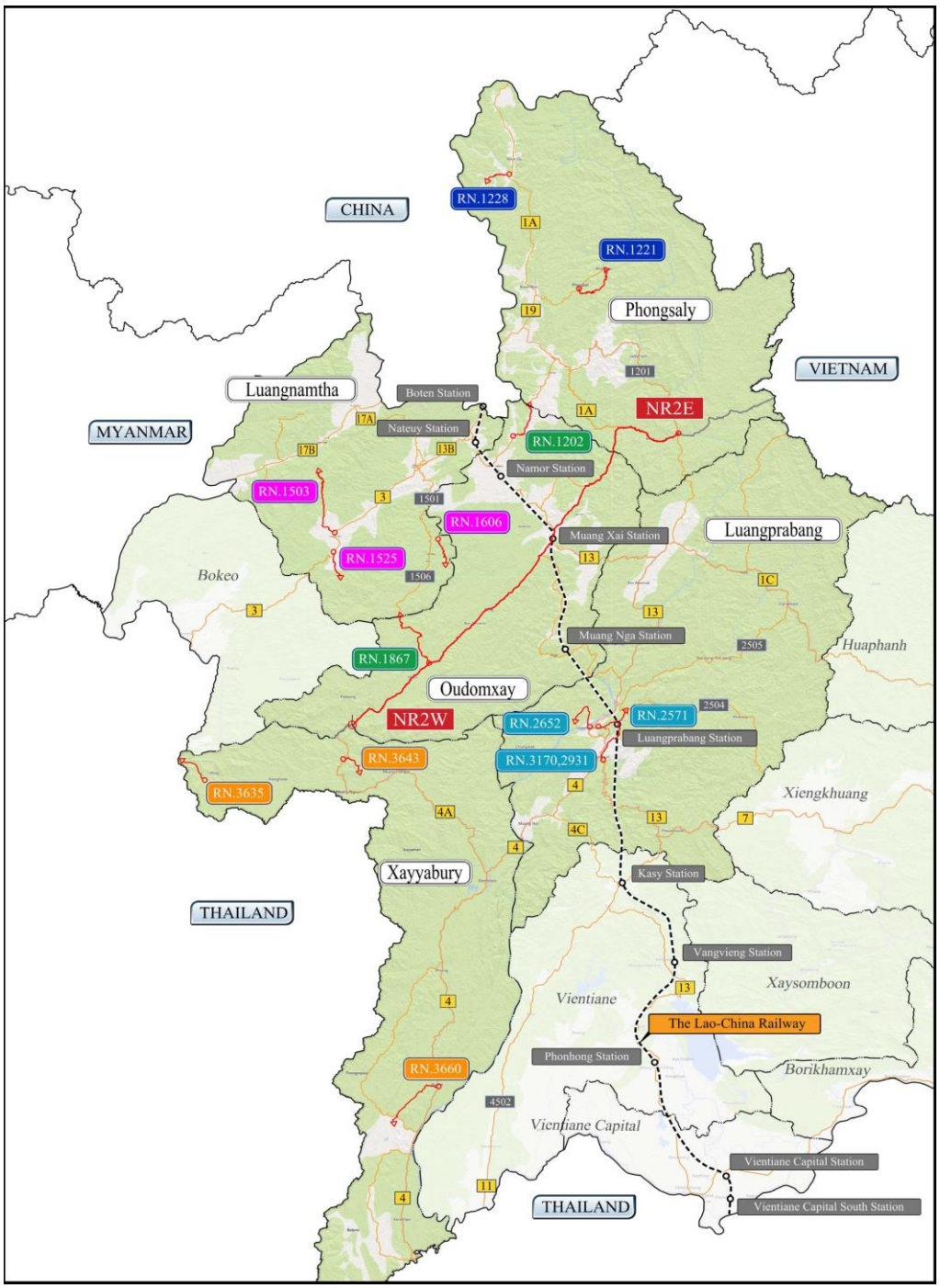


Figure 1: Project Location, NR2E & NR2W

2.2. Description of Works and Design

Road works involve bringing the existing road to a minimum width as below:

- Mountainous terrain: Widening existing road width to 8.0 meters: traffic lanes 3.0x2, shoulders 1.0x2, and provided reinforced concrete U-Ditch or trapezoidal ditch liner in village area and the area where the gradient ≥ 4%.
- Some section through to village area is only extend to 7.0 meter: traffic lanes 3.0x2, shoulders 0.5x2. and provided reinforced concrete U-Ditch with top cover for pedestrian sidewalk.
- Flat and Rolling terrain: Widening existing road width to 9.0 meters: traffic lanes 3.0x2, shoulders 1.5x2, and provided reinforced concrete U-Ditch or trapezoidal ditch liner in village area and the area where the gradient ≥ 4%.
- In case of urban areas, if the width cannot be maintained at 9m due to the important impacts, the Solutions by Install the Rumble Strips and Calming sign.

It will also include pavement strengthening, shoulder improvement, embankment improvement, provision and improvement of drainage structures. Following the principles established in the project's resettlement framework, the effort will be made to restrict all improvement works within the existing right-of-way to minimize land acquisition and resettlement.

As required by the DOR-MPWT, Road Class III in rolling and mountain terrain is applied for geometric design of this project. The scope of the project is improvement of the entire road to ASIAN Highway Class III Standards. The Project has therefore adopted flexible pavement by applying a blend of AASHTO Guide for Design of Pavement Structures 1993 and Road Design Manual (2018.8) of the MPWT, as shown in the table below.

Table 1: Project Road Standard

Category	**Unit**	**Application**			
		Urban		Flat to rolling	Mountainous
No. of lanes	Lane	2-way, 2-lane		2-way, 2-lane	2-way, 2-lane
Total width	M	9.6 – 10.6	11.6	7.0-9.0	
Carriage way	M	2@3.0 =6.0	2@3.0 =6.0	2@3.0 =6.0	2@3.0 =6.0
Road shoulder	M	0.5 -1.0	1.5 + U-ditch	0.5-1.5	0.5-1.0
Sidewalk	m	2@0.8=1.6	2@0.8=1.6	-	-

Typical cross sections are shown in the figures below.

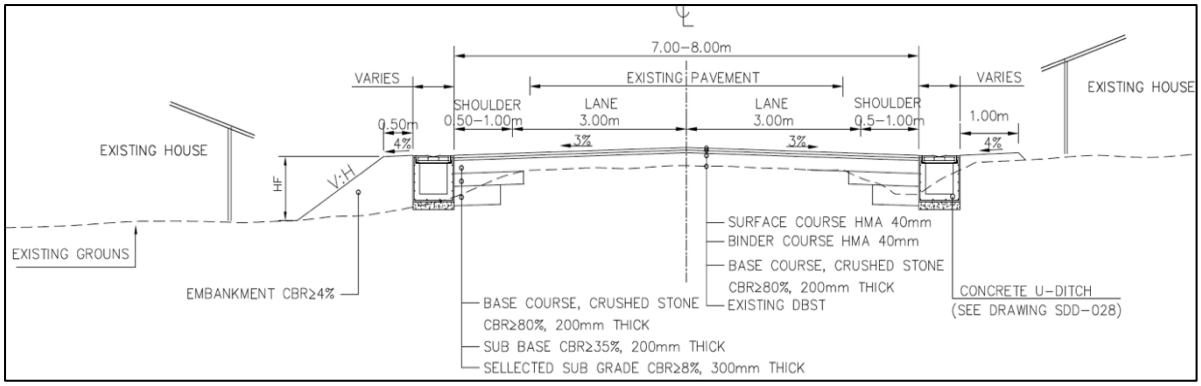


Figure 2: Cross Section Through Village Area (TC1)

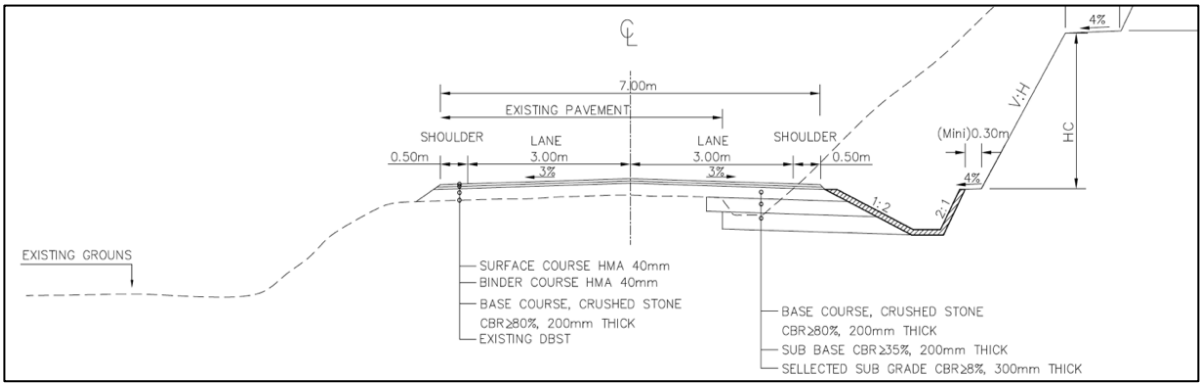


Figure 3: Cross Section Non-village and Mountainous Area (TC4)

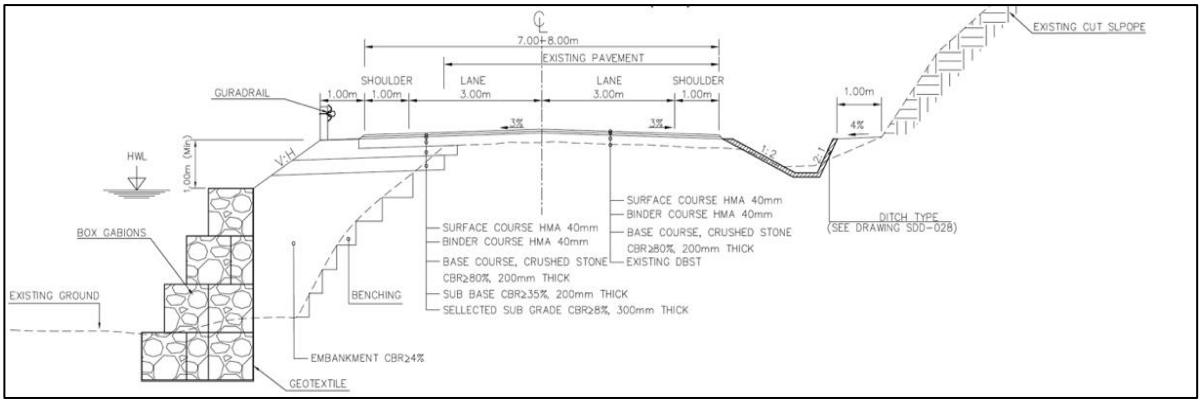


Figure 4: Cross Section Along the River (TC5)

Pavement design has proposed flexible pavement type use of asphalt concrete. The pavement design is based on a 15 years design life. The thickness design for the entire road is based on Table 2.

Table 2: Pavement Design

Sections	Design	Surface	Base Course CBR>80 (mm)	Subbase Course CBR>35, (mm)		Selected Sub-Grade
	ESA	course		Calculated	Design	CBR>8 (mm)
NR2W (Pak Beng to Muang Xai)	1.7×106	HMA 2 layers 8(4+4)cm	200	165	200	300

The specification for Bridge Design is based on AASHTO LRFD 2007 and the Road Design Manual of Ministry of Public Works and Transport (Lao PDR) 2018. The following tables show the bridges and required works.

Table 3: NR2W Bridges

#	Station	Bridge name	Exiting Bridge		New Bridge		Type of Bridge	Province
			Length (m)	Width (m)	Length (m)	Width (m)		
1	0+330	Nam Mao 1	33.6	6	36	10.7	I-Girder	Oudomxay
2	10+240	Nam Mao 2	16.8	6	25.7	10.7	I-Girder	Oudomxay
3	14+360	Nam Kird	13.2	7	25.7	10.7	I-Girder	Oudomxay
4	20+050	Huay Lamad	8.8	7	10	10.7	Slab	Oudomxay
5	29+400	Nam Sat	19.91	10	Preserved			Oudomxay
6	35+080	Nam Met	28.2	6	33	10.7	I-Girder	Oudomxay
7	48+780	Nam Lor	16.8	6	18	10.7	I-Girder	Oudomxay
8	57+340	Nam Hao	33.6	6	33	10.7	I-Girder	Oudomxay
9	82+560	Nam Beng	32.4	7	99	10.7	I-Girder	Oudomxay
10	84+390	Nam Kao	11.4	6	18	10.7	I-Girder	Oudomxay
11	86+655	Nam Kham	34.2	6	33	10.7	I-Girder	Oudomxay
12	89+710	Nam Oun	33.6	6	43.7	10.7	I-Girder	Oudomxay
13	100+449	Nam Yone	11.4	6	18	10.7	I-Girder	Oudomxay
14	125+892	Nam Pha	45.2	6	51.4	10.7	I-Girder	Oudomxay

#	Station	Bridge name	Exiting Bridge		New Bridge		Type of Bridge	Province
			Length (m)	Width (m)	Length (m)	Width (m)		
15	129+403	Nam Saneub	22.2	6	25.7	10.7	I-Girder	Oudomxay
16	132+569	Nam Kasan	22.2	6	33	10.7	I-Girder	Oudomxay
17	135+750	Nam Ka	61.5	6	69	10.7	I-Girder	Oudomxay

Box 1: Road Safety in Design

Road safety has been considered in a comprehensive way through all aspects in the design of highways. The safety features that were used in the project road design are as follows:

- *Provision of a wider (0.5 to 2 meters depending on proposed road standard) sealed shoulder and side walk in community areas;*
- *Provision of Bus Bay and public parking area at road side where there is suitable space;*
- *Improvement of poor sight distances;*
- *Improved horizontal geometry by providing curve widening at on all sharp curves;*
- *Traffic Calming, Amber flashing where these should be provided;*
- *Road signs such as warning, information and direction signs, especially at curves less than 50 kph and installation of chevron signs;*
- *Raised pavement markers and provision of rumble bars on pavement at small radius curves;*
- *Lane Markings consist of centerline, edge line and pedestrian crossing;*
- *Pedestrian crossings, speed bumps and/or rumble strip at the entrance of populated area and through the towns;*
- *Chicanes, physical traffic islands constructed on the shoulders to reduce speeds to the desired level, where the road passes through communities;*
- *Traffic islands and channelization at key intersection; and*
- *Guardrails provided on bridge approaches, box culverts and area where sharp curves, and high embankments;*
- *Provides chevron sign, audio tactile line at edge line and centreline on hazardous curves and where suspect incident.*

2.3. Construction Materials and Resources

Material used for road embankments and pavement layers will be procured from borrow pits. The material can be divided as soils, sands and silts, clay, and gravel.

7 borrow pits sites, 4 rivers gravels sites, 3 river sands and 4 quarry sites have been found for possible sources for NR2W (the status of their licenses and permits are not currently known and would need to be obtained as part of the Contractors activities, as set out in this ESMP). These soil materials are primarily characterized as clayey sand some gravels, silty gravels, clayey laterites, poorly graded sand and poorly gravel sand, well graded sands and gravel sands, crushed rhyolite. This shows that the project site should not have a problem for the necessary materials for subgrade and sub-base construction.

The locations of the extraction points for non-potable water have yet to be determined, although they should be approved by the Engineer prior to the start of extraction. Potable water will also need to be sourced for construction camps, the requirements of which are discussed as part of the Projects ESMP.

2.4. Camp Sites & Accommodation

Camp sites will be selected keeping in view the availability of an adequate area for establishing campsites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the Contractor after the approval from the Engineer.

It will not be possible to locate campsites within the ROW and the Contractors will have to acquire land on lease from private landowners. The construction camp will have facilities for site offices, staff accommodation, workshop and storage yard, and other related facilities including fuel storage. The Contractor will provide the following facilities in the construction camps:

- Safe and reliable water supply.
- Hygienic sanitary facilities and sewerage system. With separate accommodation and toilet for male and female staff and workers.
- Treatment facilities for sewerage of toilet and domestic wastes
- Storm water drainage facilities.
- Sickbay and first aid facilities.

Detailed criteria for siting of construction camps and establishment of facilities are given in this ESMP. Specific requirements for accommodation are set out in the LMP.

2.5. Temporary Storage and Diversions

Temporary storage areas will be required for certain activities, such as the storage of sand and gravels and construction equipment. These storage areas may range in size from 50 m^2 to more than a hectare. The precise locations of these temporary facilities are not known at this stage, as such mitigation measures will be prepared to ensure that these areas are sited in approved locations.

The road will be kept open throughout construction. Some diversions may potentially be required during the construction phase around key work zones, notably at bridge sites and these

diversions are discussed below in Section 3 of the ESIA. The scope of all other diversions will be determined by the Contractor.

3. PROJECT STANDARDS

The Project will conform to the legal and administrative requirements of Lao PDR. The Project will also conform to international treaties to which the Lao PDR is signatory, and to standards and safeguard policies of the World Bank. The following section provides the key environmental and social standards the Project will meet. Full details of the legal and adminitrative Project framework are included in the Project ESIA.

3.1. Key Standards

3.1.1. Air Quality

WBG Environmental, Health, and Safety General Guidelines (WBG EHS Guidelines)

WBG EHS Guidelines, which are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), follows WHO Air Ambient Air Quality Guideline. The following table illustrates the guidelines.

Table 4: WHO Ambient Air Quality Guidelines [2]

Parameter	Averaging Period	Guideline Value	
		($\mu g/m^3$)	(mg/m^3)
Sulphur Dioxide (SO_2)	10 minute	500	0.5
	24 Hour	20	0.02
Nitrogen Dioxide (NO_2)	1 Hour	200	0.2
	1 Year	40	0.04
Particulate Matter PM_{10}	24 Hour	50	0.05
	1 Year	20	0.02
Particulate Matter $PM_{2.5}$	24 Hour	25	0.025
	1 Year	10	0.01

National Air Quality Standards

Table 5 tabulates the Lao PDR ambient air quality standards.

[2] Not including interim targets.

Table 5: National Ambient Air Quality Standards [3]

Parameter	Symbol	1 hour	8hour	24 hour	1 month	1 year	Unit
Carbon Monoxide	CO	31	11.1	-	-	-	mg/m^3
		30	9	-	-	-	ppm
Nitrogen Dioxide	NO_2	0.223	-	-	-	0.0405	mg/m^3
		0.11	-	-	-	0.02	ppm
Sulphur Dioxide	SO_2	0.367	-	0.141	-	0.10	mg/m^3
		0.13	-	0.05	-	-	ppm
Total Suspended Particulate	TSP	-	-	0.33	-	0.10	mg/m^3
Particulate Matter less than 10 microns	PM-10	-	-	0.12	-	0.05	mg/m^3
Particulate Matter less than 2.5 microns	PM-2.5	-	-	0.05	-	0.015	mg/m^3
Ozone	0_3	0.20	0.14	-	-	-	mg/m^3
Lead	Pb	-	-	-	-	0.00015	mg/m^3

Source: General Air Quality Standard. National Environmental Standard (No 81 NA). 21 February 2017

Project Air Quality Standards

WBG General EHS Guidelines (Air Emissions and Ambient Air Quality, 2007) note that project emissions should not result in exceedances of "relevant ambient quality guidelines and standards by applying **national legislated standards**, or in their absence, the current WHO Air Quality Guidelines". As indicated above, Lao PDR has national legislated standards and as such these will be applied to the project.

[3] Decree on National Environment Standard dated 81/GV, dated 21 Feb. 2017

3.1.2. Noise

WBG Environmental, Health, and Safety General Guidelines (WBG EHS Guidelines)

According to the WBG General EHS Guidelines (Noise Management, 2007), noise impacts should not exceed the levels presented in Table 6, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 6: WBG Noise Level Guidelines, One Hour LAeq (dBA)

Receptor	Daytime (07.00 – 22.00)	Night-time (22.00 – 07.00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

National Noise Standards

Table 7 provides the national noise standards for Lao PDR. It can be noted that nighttime noise limits are particularly stringent with regards to sensitive receptors such as hospitals and schools.

Table 7: Noise Standards for Other Places (LAeq 24-hrs)

Area	dB(A): 06.00 – 18.00	dB(A): 18.00 – 22.00	dB(A): 22.00 – 06.00
Hospitals, libraries, kindergarten, schools	50	45	40
Residential areas	55	55	45
Commercial areas	70	70	50

Project Noise Standards

National standards are more stringent than WBG standards and will be used for the Project.

3.1.3. Vibration

International Standards

The German Standard DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures provides short term and long-term limits [4] for vibration at the foundation for various structures. This standard is considered international best practice for construction vibration.

[4] short-term vibrations are defined as those that do not occur often enough to cause structural fatigue and do not produce resonance in the structure being evaluated and long-term vibrations are all the other types of vibration.

Table 8: Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Short-term and Long-term Vibration on Structures

Group	Structure	Guideline Value for Velocity (mm/s)				
		Short-term				Long-term
		At Foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB)	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g., buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures

DIN 4150-3 notes that "experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage".

Regarding vibration from construction traffic, the maximum permissible limit of traffic vibration, Article 12 of Ministerial ordinance for the regulatory of vibration Japan, 1976 is considered to represent good international practice with a guideline limit of 65dB set for roadside residents in terms of vibration nuisance.

Project Vibration Standards

German Standard DIN 4150-3 will be followed during the construction phase relating to vibration from work sites. Japanese standards will be followed for construction traffic vibration of-site.

3.1.4. Water Quality

WBG Environmental, Health, and Safety General Guidelines (WBG EHS Guidelines)

The WBG provides guidelines values for treated sanitary sewage discharges. The following table provides these values with which the Project shall also comply, for example relating to any wastewater discharge from construction camps.

Table 9: WBG Indicative Values for Treated Sanitary Sewage Discharges

Pollutant	Unit	Guideline Value
pH	pH	6-9
Biological Oxygen Demand (BOD)	Mg/l	30
Chemical Oxygen Demand (COD)	Mg/l	125
Total Nitrogen	Mg/l	10
Total Phosphorus	Mg/l	2
Oil and Grease	Mg/l	10
Total Suspended Solids	Mg/l	50
Total Coliform Bacteria	MPN[A] / 100 ml	400

Table 10: National Wastewater Effluent (General Industrial Wastewater Discharge)[5]

Parameter	Symbol	Standard Value	Unit	Analysis Method
Potential of Hydrogen	pH	6-8.5	No defined	pH Meter
Total Dissolved Solid	TDS	<2,500 mg/l depending on industrial activities and water body, but <5,000 mg/l	mg/L	Dry evaporation at temperature 103-105^{O}C, 1 hour
Total Suspended	TSS	<50 mg/l depending on industrial activities and water body, but <150 mg/l	mg/L	Glass Fiber Filter Disc
Temperature	t	<40	^{O}C	Temperature Meter
Color and Odor	No defined	No	No defined	General
Hydrogen Sulfide	H_2S	<1.0	mg/L	Titration
Cyanide	CN^-	<0.2	mg/L	Distillation and Pyridine Barbituric Acid
Fat, Oil and Grease	FOG	<5.0 mg/l depending on industrial activities and water body, but <15.0 mg/l	mg/L	Solvent Extraction by Weight
Formaldehyde	CH_2O	<1.0	mg/L	Spectrophotometry

[5] Decree on National Environment Standard dated 81/GV, dated 21 Feb. 2017

Parameter	Symbol	Standard Value	Unit	Analysis Method
Phenol	C_6H_5OH	<1.0	mg/L	Distillation and Aminoantipyrine Method 4
Chlorine	Cl^-	<1.0	mg/L	Lodometric Method
Pesticide	-	No	mg/L	GC
Biological Oxygen Demand 5 Days	BOD_5	<30 mg/l depending on industrial activities and water body, but <60 mg/l	mg/L	Azide Modification at 20^OC, 5days
Total Nitrogen	TKN	<100 mg/l depending on industrial activities and water body, but <200 mg/l	mg/L	Kjeldahl
Chemical Oxygen Demand	COD	<120 mg/l depending on industrial activities and water body, but <400 mg/l	mg/L	Potassium Dichromate Digestion; Open Reflux or Closed Reflux
(Heavy metals)				
Zinc	Zn	<5.0	mg/L	AA/AES; ICP
Chromium Hexavalent	Cr^{+6}	<0.25	mg/L	AA/AES; ICP
Chromium Trivalent	Cr^{+3}	<0.75	mg/L	AA/AES; ICP
Copper	Cu	<2.0	mg/L	AA/AES; ICP
Cadmium	Cd	<0.03	mg/L	AA/AES; ICP
Barium	Ba	<1.0	mg/L	AA/AES; ICP
Lead	Pb	<0.2	mg/L	AA/AES; ICP
Nickel	Ni	<1.0	mg/L	AA/AES; ICP
Manganese	Mn	<5.0	mg/L	AA/AES; ICP
Arsenic	As	<0.25	mg/L	AA-Hydride Generation or ICP
Selenium	Se	<0.02	mg/L	AA-Hydride Generation or ICP
Mercury	Hg	<0.005	mg/L	AA-Cold Vapour Technique

Project Water Quality Standards

The Project will follow national standards for water quality and wastewater effluent.

3.2. Permits

The following table indicates the permits that are required for various scales of Projects in Lao PDR.

Table 11: Permit Requirements

#	Description	Scale	Permitting Authority
1	Water extraction	Small project	Natural Resources and Environment Office, District
		Medium project	Department of Natural Resources and Environment, Province
		Large project	Ministry of Natural Resources and Environment
2	Borrow Pit	Small project	Energy and Mines Office, District
		Medium project	Department of Energy and Mines, Province
		Large project	Ministry of Energy and Mines
3	Removal of Trees	Development Project	Village authority & Agriculture and Forest Office

Note: The Contractor will be responsible for determining which of the relevant authorities he will obtain the permits from depending upon the volumes of water and borrow material required under the project.

3.3. WBG General EHS Guidelines

In addition to the above, the WBG General EHS guidelines also provide extensive guidance on a range of other EHS issues, such as occupational health and safety, community health and safety, etc. The mitigation measures that have been adopted for this Project have included all the relevant WBG EHS guidelines, including:

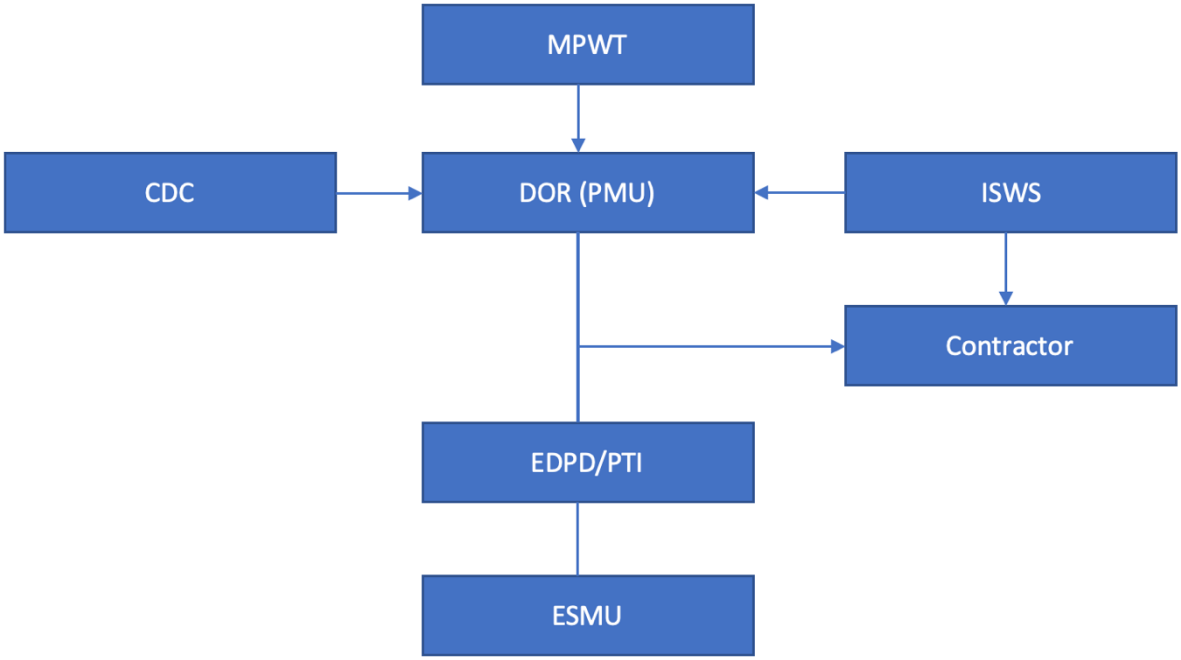
- Air Emissions and Ambient Air Quality
- Wastewater and Ambient Water Quality
- Hazardous Materials Management
- Waste Management
- Noise
- Contaminated Land
- Community Health and Safety

- Occupational Health and Safety

4. IMPLEMENTATION

The main institutions that will be involved in implementation of the ESMP are the Concept Design Consultant, the Implementation Support and Works Supervision Consultant (ISWS, or "the Engineer"), the Contractor(s) and the MPWT through its Project Management Unit (PMU) and the Environment research and Disaster Prevention Division of the Public Works and Transport Institute (EDPD/PTI).

Figure 5: Implementation Framework



4.1. Concept Design Consultants (CDC) Responsibilities

The CDC will ensure understanding of all the identified environmental impacts highlighted by this ESIA and that all recommendations made for the design phase of the ESMP are considered and incorporated in the concept designs, or that justifications are made for the exclusion of any recommended mitigation measure.

4.2. ISWS (Engineer) Responsibilities

The Engineer is tasked with specific responsibility to ensure safeguard compliance of civil works – with particular emphasis on the monitoring of implementation of ESMP through the Contractors Construction Environment and Social Management Plan (CESMP). The Engineer will help DoR manage year 1 of the O&M phase of the contract, including monitoring of environmental and social issues. The Engineer will ensure the Contractor's ESHS performance is in accordance with good international industry practice and delivers the Contractor's ESHS obligations.

A detailed Terms of Reference (ToR) has been prepared for the Engineer, and is provided in Appendix A.

The Engineer shall assist DoR/MPWT and EDPD/PTI in carrying out any leftover tasks of Resettlement Action Plan (ARAP/RAP) implementation and also addressing any additional resettlement impacts including the relocation of public utilities caused by the detailed design as well as preparing the RAP closure report. The tasks are provided in the Project RAP.

The Engineer will provide technical and management support to EDPD/PTI (or sometimes it is called ESMU established for the project) and PRCs to carry out the requirements of the EGEP. The EGEP provides full details of these requirements. Further the Engineer shall assist DoR/MPWT and EDPD/PTI in the review and implementation of the LMP (see LMP for full responsibilities)

To achieve this, the Engineer will include:

- A senior Environmental Safeguards Specialist (SESS) for 8 months
- A senior Social and Resettlement Specialist (SSRS) for 6 months
- A national Environmental Specialist (ESS) for 38 months
- A national Social Safeguard Specialist (SSS) for 38 months
- A full time national Occupational Health and Safety Specialist (OHSS) for 38 months
- A Sexual Exploitation and Abuse Specialist / Sexual Harassment Specialist (SEAS/SHS) for 12 months
- A local Road Safety Specialist (RSS) for 40 months

This team of specialists will monitor implementation of the ESMP during construction and first year of the O&M period. In addition, an International Team Leader of the Engineer will take overall responsibility in ensuring that the Project is implemented consistent with the provisions of the ESMP. If the Engineer identifies any CESMP non-compliance issues by the Contractor, a Non-Compliance Notice will be issued to the contractor if the Engineer requires action to be taken. The Contractor will be required to prepare a corrective action plan which is to be implemented by a date agreed with the Engineer. Non-compliance will be ranked according to the following criteria:

- Non-Compliance Level l: A situation that is not consistent with requirements of the ESMP/CESMP, but not believed to represent an immediate or severe social or environmental risk. Repeated Level I concerns may become Level II concerns if left unattended.
- Non-Compliance Level II: A situation that has not yet resulted in clearly identified damage or irreversible impact, but which demonstrates potential significance. Level II requires expeditious corrective action and site-specific attention to prevent severe effects. Repeated Level II concerns may become Level III concerns if left unattended.
- Non-Compliance Level III: A critical situation that will result in significant social or environmental damage occurring or a reasonable expectation of very severe impending damage. Intentional disregard of Non-Compliance Notices or specific prohibitions is also classified as a Level III concern.

The failure to prepare a corrective action plan or to implement it within the required timeframe will result in the Employer undertaking the work at the Contractor’s expense (as will be specified in the Contract).

A Terms of Reference for the specialists are provided in Appendix A.

4.3. Contractor Responsibilities

The Contractor will appoint one full-time Environmental and Social Manager (ESM), one full-time Occupational Health and Safety Manager (OHSM) and a part-time Ecological Clerk of Works (ECOW) to be a senior members of the construction management team based on site for the duration of the contract. The Contractor will also include a full-time Community Liaison Officer (CLO).

The ESM will have a university degree (preferably at Master's level) in Environmental Science or related discipline and have at least 10 years work experience in environmental management of infrastructure projects. The OHSM will have a university degree and a recognized health and safety certification and at least 10 years work experience in health and safety issues for infrastructure projects. The ECOW will have at least 5 year's experience of managing biodiversity related issues on major infrastructure projects.

Key responsibilities of the Contractor (through the ESM, ECOW, CLO and OHSM) are as follows:

- Completing detailed design including all the environmental and social mitigation measures in this ESIA and detailed in this ESMP.
- Preparing the CESMP, based on this ESMP, for approval by the Engineer prior to the Contractors taking possession of the construction site (see below).
- Ensuring the CESMP is implemented effectively throughout the OPBRC contract period (construction and O&M).
- Coordinating community relations issues through acting as the Contractor's community relations focal point (proactive community consultation, complaints investigation and grievance resolution).
- Ensuring greivances are addressed in a timely manner.
- Provide technical guidance on the implementation of the BMP.
- Coordinate the pre-construction surveys, biodiversity checks and monitoring in accordance with the BMP, ESMP and ESIA.
- Undertake supervisory tasks including the supervision of the habitat clearance works.
- management of the biodiversity 'permit to work systems' and compliance monitoring and enforcement.
- Establishing and maintaining site records of:
    - Weekly site inspections using checklists based on the CESMP;
    - Environmental and health and safety accidents/incidents including resolution activities (including reporting of accidents to the ISWS Consultant);
    - Non-compliance notifications issued by the Engineer;
    - Corrective action plans issued to the Engineer in response to non-compliance notices;
    - Community relations activities including maintaining complaints register;
    - Preparing monitoring reports (Monthly);

- Routine reporting of CESMP compliance and community liaison activities;
- Ad hoc reporting to the Engineer of environmental incidents/spillages including actions taken to resolve issues; and
- Provide daily toolbox training at the construction camp and also at construction sites. The ESM and OHSM will keep a record of all monthly training and toolbox training undertaken.

The Contractor will also be responsible for implementing:

- Stakeholder Engagement Plan (SEP) – Implementation of the SEP will be the responsibility of MPWT Project Director (PD), Project Manager (PM); Component Managers from other ministries and EDPD/PTI. However, the Contractor, through his Chief Engineer, also has the following responsibilities as set out in the SEP:
  - Carries out consultations with stakeholders on project timeline, mitigation of civil work activities; (such as dust, traffic), informs stakeholders about jobs;
  - Ensures careful consideration of women and vulnerable groups, including them in consultations and that they do not miss out on job opportunities;
  - Conducts training on Code of Conduct for workers, including on appropriate behavior and relations with community and gender-based violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment and Violence Against Children (VAC);
  - Conducts trainings and awareness activities on road safety to be implemented together with the traffic police and target audience.
- Labour Management Plan (LMP)

4.4. Government Responsibilities

A PMU established within the Department of Roads (DoR) will be responsible for the day-to-day management of the Project components. The Environment research and Disaster Prevention Division of the Public Works and Transport Institute (EDPD/PTI) of MPWT will lead all aspects of ES safeguards preparation, implementation, supervision and reporting. EDPD/PTI is responsible for fulfilling ES safeguards policy requirements as agreed with WB and EIB as well as those to be required by GOL (IEE, and resettlement) applicable to the Project. An Environmental and Social Management Unit (ESMU) has been established within the EDPD/PTI and will be responsible for overseeing and monitoring implementation of the ESMP, RAPs, LMP, SEP, EGEP and gender action plan (GAP). The ESMU responsibilities in respect of implementation of the ESMP will be as follows:

- Overseeing full compliance with project safeguard instruments and will conduct monitoring of safeguard policy implementation.
- Ensure that all relevant ESMP requirements (including environmental designs and mitigation measures) are duly incorporated into the project bidding documents.
- Review necessary permits and/or clearance, as required, from MONRE / PONRE and other relevant government agencies, ensuring that all necessary regulatory clearances are obtained by the Contractor before commencing any civil work on the project.
- Liaising with the Department of Environment and Social Impact Assessment of the Ministry of Natural Resources and Environment (MONRE).

- Ensure that the Contractor has access to the ESMP and ESIA report and ensuring they are included in bidding documents.
- Ensure that the Contractor understands his responsibilities to mitigate environmental problems associated with their construction activities and facilitate training of their staff in implementation of the ESMP.
- Approve the CESMP, with support from the engineer, before the Contractor takes possession of construction site.
- Undertake regular site visits to assess the Contractors compliance with the ESMP / CESMP and make recommendations to the Contractor where non-compliance issues are identified.
- Keep proper safeguards documentations.
- Lead safeguard supervision and reporting at the project level. ESMU will prepare six month and annual safeguard progress report.
- Integrating the gender dimension into safeguards documents, and consultation processes;
- Track and report on grievances received, addressed, and overall work and implementation of the grievance redress mechanism (GRM).
- Regular coordination and meetings with the Engineer to discuss Project progress and any issues.

The ESMU Manager, will also be responsible for overall planning and implementation of environmental and social management for the Project, as well facilitating consultation activities, and coordination with local authorities, AHs, NGOs/civil society organizations (CSOs) and other stakeholders. The ESMU will monitor and report on the effectiveness of implementation of the ESMPs and RAPs and coordinate activities during construction and post-construction aimed at improving the environmental and social performance of the Project.

The ESMU will support the PMU to prepare all documentation and reports concerning the environmental and social aspects of the Project including progress reports to be submitted to PMU and DONRE/PONRE during the implementation period.

The ESMU will work closely with the Project Resettlement Committee (RC) to review and address all complaints and grievances arising in the course of implementation of any ESMP and RAP and resolve them as far as it can with the concerned parties. If the complainant is not satisfied, the matter will be resolved through appeal and tracking through the grievance redress procedure.

The ESMU Manager will report directly to PMU and work closely with provincial/district authorities. The role of the ESMU Manager will be to ensure that the environmental and social mitigation and monitoring measures are implemented during the course of Project construction and operation. The ESMU Manager will act on behalf of the PMU in dealing with Government agencies, RC, or other concerned parties, and will be the MPWT/PMU representative on the RC.

The activities of the ESMU manager will include, but not necessarily be limited to:

- Maintaining good relations and communication with the local communities affected by or involve in the project;
- Coordination, supervision, monitoring and reporting on activities undertaken in compliance with the ESMP, RAP and EGEP;

- Liaising between the project manager (PMU), consultants, Government agencies, RC, and contractors/agencies engaged to implement the ESMPs and RAP;
- Supervising and monitoring field activities in relation to ESMP and RAP implementation;
- Preparing internal progress reports as required and reporting to the head of the PMU.

At the district level, project implementation teams (PIT) will be established to oversee the implementation of the project, including environmental and social safeguards, at the project towns. The responsibilities of the PIT are summarized below:

- Coordinate the implementation of project activities at the provincial and district level;
- Ensure the implementation of the approved work plans and program of activities;
- Prepare and submit regular quarterly and annual physical and financial progress reports to the PMU;
- Oversee and coordinate civil works and construction activities;
- Ensure the implementation of social and environmental safeguards and including timely disclosure of safeguards documents;
- Ensure the implementation of the SEP, Gender Action Plan, and EGEP;
- Ensure implementation of RAPs including adequate measures to mitigate adverse resettlement impacts;
- Coordinate implementation of environmental management plan, and submit regular monitoring reports to the PMU;
- Coordinate the updating of the resettlement plans and monitor implementation of resettlement activities; and
- Undertake monitoring of project activities and prepare regular reports to the PMU on project achievements.

4.5. Construction Environmental and Social Management Plan (CESMP)

Following the award of the contract and prior to construction commencing the Contractor will review the ESMP and develop this into his detailed CESMP. The CESMP will identify persons who will be responsible for supervising the work within the Contractor's team. This information will be presented in a series of site plans covering the whole project site showing all environmental management requirements for all activities in the construction phase. The CESMP will also include the following plans:

- Pollution Prevention Plan
- Waste Management and Recycling Plan
- Construction Camp Management Plan
- Borrow Pit Plan (if required)
- Emergency Response Plan
- Air Quality Plan
- Occupational Health and Safety Plan
- Community Health and Safety Plan

- Traffic Management Plan
- Bridge Construction Plan
- Topsoil Management Plan
- Spill Response Plan
- Construction Vibration Management Plan
- Chance Find Procedure
- Method Statement for Spoil Disposal

The CESMP will also include a monitoring plan and a reporting program corresponding to the requirements of the ESMP. The CESMP, and all its plans without exception, will be submitted to the Engineer, PMU and World Bank for review and will require approval from the Engineer prior to the Contractor taking possession of any work site.

4.6. Site Induction

Following approval of the CESMP the Contractor will be required to attend a site induction meeting with the Engineers IESS whereby the CESMP is confirmed with the Contractor to ensure that all compliance conditions are clearly understood. Following confirmation of the CESMP with the Contractor the SESS advises the Engineers Team Leader that the Contractor is now cleared to take possession of the Site, RAP implementation is substantially completed and may commence moving equipment to the Site. The Contractor will be responsible for ensuring that all sub-contractors abide by the conditions of the CESMP.

4.7. Reporting

Contractors Reporting – The Contractor will prepare two levels of environmental and social reports:

- Weekly Environmental Checklists – These will be prepared weekly by the Contractors ESM and will be submitted to the Engineer on a weekly basis.

- Monthly Summary Report – in respect of compliance with ESMP / CESMP requirements that will be submitted to the PMU through the Engineer. The report will contain sections relating to:

    - environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies, temples or cultural heritage site, protected areas, etc.;

    - health and safety incidents, accidents, injuries and all fatalities that require treatment;

    - interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);

    - status of all permits and agreements:

        - work permits: number required, number received, actions taken for those not received;

- status of permits and consents:
  - list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to the engineer, status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
  - list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);
  - identify major activities undertaken in each area this month and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);

- health and safety supervision:
  - occupational, health and safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;
  - number of workers, work hours, metric of PPE use, worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);

- worker accommodations:
  - number of expats housed in accommodations (camp site accommodation), number of locals and number of females;
  - date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice (EBRD/IFC Guidance), including sanitation, space, etc.;
  - actions taken to recommend/require improved conditions, or to improve conditions.

- HIV/AIDS: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);

- gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);

- training:
  - number of new workers, number receiving induction training, dates of induction training;

- number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;
- number and dates of HIV/AIDS sensitization training, no. workers receiving training (this month and in the past); same questions for gender sensitization, flag lady/flagman training.

- environmental and social supervision:
  - Environmental and social person(s): days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, stream crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management; and
  - community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.
- Grievances: list current month's and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):
  - Worker grievances;
  - Community grievances
- Traffic and vehicles/equipment:
  - traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;
  - accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;
  - overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).
- Environmental mitigations and issues (what has been done):
  - Dust, : number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/muram/spoil lorries with covers, actions taken for uncovered vehicles;
  - erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;

- quarries, borrow areas, spoil areas, batch plants: identify major activities undertaken this month at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;

- blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);

- spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination;

- waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;

- details of tree plantings and other mitigations required undertaken this month;

o compliance:

- compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;

- compliance status of ESMP/CESMP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance, status of all non-conformances identified during audits and inspections that are identified by non-compliance notices.

o other unresolved issues from previous months related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

The Contractor will have a duty to immediately and within 24 hours report to the Engineer if any serious environmental breach has occurred during construction e.g., clearing of sensitive areas, serious oil spills etc. This including serious accident cases and fatality.

Engineer Reporting – In close consultation with EDPD/PTI, the Engineer shall prepare and submit to the MPWT and World Bank, (within 14 days after the end of the period) a consolidated semi-annual and annual monitoring report for each package summarizing all environmental and social safeguard activities (ESMP, RAPs, EGEP, etc.) including progress and records on GRM and other aspects related to road safety, workers OHS, employment, community health and safety, etc. The reports shall also summarize the performance of the Engineers staff in _implementing their supervision responsibilities. Preparation of a separate RAP implementation and/or other monitoring reports may also be required during the Assignment as requested by the GOL and/or World Bank.

The Engineer shall ensure the immediate reporting to DoR/MPWT, DPWT, and EDPD/PTI of complaints related to GBV and/or child abuse, any pollution incident/accident, any fatality and/or bodily harm affecting Project (including contractor) staff or project affected people, any

public opposition, and the issuance of any notice or fine for breach of environmental, labor, health or safety laws and regulation or any significant Covid-19 outbreak.

EDPD/PTI / PMU Reporting – The ESMU/PMU will prepare six month and annual safeguard progress report and submit to the World Bank.

4.8. EDPD/PTI ESMU Capacity Building Requirements

The ESMU has experienced Safeguard Specialists with experience of oversight of these types of road rehabilitation projects. However, ESMU capacity to implement and supervise implementation of mitigation measures and monitoring program that meet international best practices could be further strengthened. The engineer's Environmental and Social Specialist tasks will include strengthening the capacity of ESMU to implement and monitor environmental and social mitigation measures and monitoring as specified in the project ESIA/ESMP.

4.9. ESMP Costs

The Contractor will be responsible for ensuring that the costs associated with implementation and monitoring of mitigation measures are included in their bid. Under the terms of the OPBRC contract the Contractor will be paid based on the achievement of milestones which will include the items included in this ESMP.

4.10. ESMP Implementation summary

The following Table summarizes the various institutional responsibilities for the implementation of the environmental management plan at various stages of the Project.

Table 12: ESMP Implementation

Project Stage	Responsible Institution	Responsibilities
Concept Design	Concept Designers	• Incorporate ESMP mitigation measures into concept design.
Detailed Design	Contractor	• Incorporate ESMP mitigation measures into final design.
	PMU	• Ensure ESMP is incorporated into the works Contracts.
	PMU & ISWS	• Review Contractors proposals to ensure that they are aware of the ESMP requirements and that line items for environmental management as per the ESMP are included in the BOQ.
Pre-construction	Contractor	• Prepare CESMP • Obtain all necessary environmental and social related permits for construction. •
	EDPD / PTI	• Review CESMP based on recommendation from the Engineer
	ISWS	• Review CESMP and provide recommendations

Project Stage	Responsible Institution	Responsibilities
	Contractor and ISWS	• Site Induction
Construction	Contractor (through its ESM)	• Daily monitoring of environmental and social issues. • Preparation of weekly environmental and social checklists. • Preparation of monthly and quarterly environmental and social reports. • Preparation of the dedicated environmental and social monitoring report (annually). • Preparing Corrective action plans. • Reporting accidents to the ISWS
	ESMU	• Routine site visits to monitor Contractors environmental and social performance.
	ISWS	• Weekly monitoring of the Contractors compliance with ESMP / CESMP by the NESS. • Issuing the Contractor with Non-compliance Notices. • Monthly reporting to PMU of Contractors performance based on the review of Contractors weekly checklists and weekly site visits. • Quarterly Environmental and Social Reports prepared by the IESS and submitted to PMU/PTI and World Bank. • Instrumental Environmental monitoring. • Reporting accidents to the PMU

4.11. Compliance

Failure to comply with the conditions of the CESMP by the Contractor will result in financial penalties – reduction in lumpsum payments during construction and O&M phases.

5. MITIGATION PLAN

The following tables provide the environmental and social mitigation plans for the design, pre-construction, construction and operational phases of the Project. The plans, organized by ESIA topics identify:

a) Potential Impacts and Risks and their specific locations along the road (if relevant)

b) Mitigation measures for each (or groups of) identified risks and impacts

c) Reference to specific implementation plans

d) The responsibilities for implementing the mitigation

e) Mitigation costs

Table 13: Environmental and Social Management Plan – Design Phase

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	**ESS1 Assessment and Management of Environmental and Social Risks and Impacts**					
ESIA and associated plans	All along the project road section	Mitigation measures not included in designs	Ensure the design phase mitigations in the ESMP are included in updated concept design and Contractors detailed designs.	ESMP	CDC and Contractor. Engineer to review designs.	N/A
	**ESS3 Resource Efficiency and Pollution Prevention and Management**					
Climate Change	All along the project road section and all culverts and side drains with special attention to: **Flood prone areas:** 5+225 7+000 14+360	Drainage	Include the following in designs: • Bridges: flood return frequency of 100 years; • Box culverts and short bridges ≤ 10 m span: flood return frequency of 50 years; • Road and pipe culvert < 2 m diameter: flood frequency of 25 years; • Side drains and ditches: flood frequency of 10 years.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under the prices quoted for other Bill of Quantity items under OPBRC contract (BOQ-OPBRC)

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	22+121 22+968 24+437 51+806 59+348 59+809 59+971 61+393 69+200 69+725 70+203 70+344 76+154 76+454 77+456 82+562 93+631 103+184 107+367	Pavement Disruption due to overtopping during intense rain	Raising of flood-prone areas above the calculated flood levels. Not included in the concept design, to be confirmed in the Detailed Design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Pavement Rutting and bleeding due to hot climate	Use of harder grade bitumen Improved asphalt mixes to resist rutting (mix design using asphalt rutting test). Appropriate Asphalt mix design to be defined during detailed design and construction	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Pavement Deformation due to moisture variations	Lime or cement stabilization of sub-base and base. Not envisaged if the pavement sub-base is placed above the design flood level, To be further defined during detailed design.	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Pavement Reduced life due to insufficient bearing capacity	Use of concrete pavement in flood plains. Used in selected areas. To be further defined during detailed design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 29+400 (Nam Sat) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone)	Bridges – Increased scour due to debris flows	Scour protection of bridge piers. Included in the concept design, to be confirmed in the Detailed Design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Bridges – Overtopping during intense rainfall	Hydraulic capacity of Bridges and resulting opening of bridges calculated with 15% safety coefficient. Included in the concept design, to be confirmed in the Detailed Design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Culverts – Overloading during intense rainfall	Hydraulic capacity of culverts calculated with 15% safety coefficient and considering 25 / 50-year flood return periods. Included in the concept design, to be confirmed in the Detailed Design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Side slopes – Erosion due to intense rainfall, section of unstable slope	Vetiver planting for slope stabilization, slope protection by wall, rip-rap and etc., Not included, as with climate and fast-growing plantations in Lao, it is naturally achieved to be confirmed in the Detailed Design	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	Obligation of the contractor covered under BOQ-OPBRC
		Side slopes near river bank –	River Bank protection considered in selected locations. Identified at new construct bridge	ESMP	Contractor	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka) **Slope protection for landslide / erosion prone areas:** 81+400-81+500 96+865-96+935 98+330-98+370 108+035-108+165 108+733-108+827 108+940-108+961 121+886-121+914	Scouring during high river levels	location and included in the concept design, to be confirmed in the Detailed Design.		Engineer to review final design documents prior to the start of construction.	covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	122+850-122+950 128+860-128+990 129+708-129+743					
Hydrology	All along the project road section and all culverts and side drains with special attention to: **Flood prone areas:** 5+225 7+000 14+360 22+121 22+968 24+437 51+806 59+348 59+809 59+971	Culverts	Per the climate change mitigation measures above.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A
		Flooding	A design discharge of 50 years return period is considered for culverts, and 100 years of bridges. If, during the operational phase of the Project, the rehabilitated road does result in increased run-off and flooding, MPWT will be responsible for rectifying this issue.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A
		Drainage	Designs shall ensure that the drains discharge to existing drainage ditches of suitable capacity, or to streams without causing erosion of embankments, flooding, or damage to properties. Prior to discharge	ESMP	Concept Design Consultant Contractor	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	61+393 69+200 69+725 70+203 70+344 76+154 76+454 77+456 82+562 93+631 103+184 107+367		from the longitudinal drains, the water should pass through an oil / grease interceptor or control valves.		Engineer to review final design documents prior to the start of construction.	
	Construction camps	Contaminated site run-off	All camps will be designed with adequate stormwater drainage systems, fitted with oil and grease interceptor tanks.	ESMP	Contractor Engineer to review final design documents prior to the start of construction.	N/A
	Rest areas	Sewage waste water	Rest areas shall be designed to include suitably sized septic tanks which will be regularly emptied and maintained by the Contractor during operational phase.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
					prior to the start of construction.	
	Bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 29+400 (Nam Sat) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng) 84+390 (Nam Kao) 86+655 (Nam Kham)	Bridges	Bridge designs will ensure that drainage from bridge decks over 50 meters does not discharge directly to the watercourses beneath the bridges. The bridge run-off waters will lead to an interceptor tank, or filter pond adjacent to the bridge in order to trap oil and grease run-off.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A
			The bridge design and layout must also be aesthetically pleasing and in harmony with the existing environment.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	89+710 (Nam Oun) 100+449 (Nam Yone) 125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka)					
Geohazards	All along the project road section	Earthquakes	Ensure that all Project components are designed and constructed in accordance with national design standards for earthquakes.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A
	Slope protection for landslide / erosion prone areas:	Slope Protection	Ensure that detailed designs include all the specified slope protection measures outlined in the concept design and discussed in the Project Description section of this report.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	81+400-81+500 96+865-96+935 98+330-98+370 108+035-108+165 108+733-108+827 108+940-108+961 121+886-121+914 122+850-122+950 128+860-128+990 129+708-129+743				prior to the start of construction.	
Noise	All along the project road section with special attention to sensitive receptors:	Elevated noise levels	MPWT undertakes a program of consultation with stakeholders within the Project corridor to determine views on elevated noise levels. If stakeholders do not think noise is a significant issue and they are not concerned about increases in noise levels no further actions should be considered during this stage of the Project. However, routine monitoring of noise levels along the road, (at	ESMP	MPWT	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Schools: 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000 **Markets:** 10+500 82+300 85+900 86+400		building facades) should be undertaken annually to assess how noise levels are changing year or year. If stakeholders feel that noise is a significant issue and that they are concerned about increases in noise levels the MPWT should prepare a noise model to determine the exact nature and extent of any noise levels increase over the next 20 years. The model should be part of a report that recommends precise mitigation measures, or a combination of measures, to reduce noise levels. The MPWT would then have to consult with the stakeholders to confirm that they are willing to accept the proposed mitigation measures and then implement the noise mitigation measures.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Health Facilities: 59+500 59+500 89+300 102+800					
	**ESS4: Community Health and Safety**					
Community Health and Safety	All along the project road section with special attention to sensitive receptors: **Schools:** 8+800 25+700 32+700 34+600 52+800 60+100 64+200	Health and Safety	Traffic safety issues will be accounted for during the design phase of the Project. Safety signs will be included in the design warning people not to attempt to cross the four-lane section of the road without using dedicated crossing areas. Project sticker with contact information of site supervisor should put on all contractor's, sub-contractor's vehicles and equipment and all projects vehicles and equipment.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents prior to the start of construction.	N/A
		Road Crossings	Designs to include suitable road crossings outside of schools and markets and at regular intervals in urban areas. Speed bumps should be considered outside all schools along the alignment.	ESMP	Concept Design Consultant Contractor Engineer to review final design documents	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000 **Markets:** 10+500 82+300 85+900 86+400 **Health Facilities:** 59+500 59+500 89+300 102+800				prior to the start of construction.	

Table 14: Environmental and Social Management Plan – Pre-construction Phase

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	**ESS1 Assessment and Management of Environmental and Social Risks and Impacts**					
Permits and Licenses	All along the project road section	Tree cutting, borrow pits[6], camp sites, ancillary plant and water extraction	Obtain all necessary permits and licenses to operate these facilities.	CESMP	Contractor to obtain permits. Engineer to review permits.	N/A
Staff	All along the project road section	Lack of E&S staff	Ensure the Contractor, ISWS and PMU E&S staffing is in place per the ESMP	ESMP	MPWT	Staffing costs – see Table 13
Stipulated Contractual Penalties	All along the project road section	Repeated non-compliance on key ES impacts	Stipulate more stringent contractual penalties (in case of repeated non-compliance on key ES impacts that could lead to serious or severe E&S incident including road safety, community safety, and delay due to coordination among concerns agencies).	Contractual documents	MPWT	N/A
ESMP Requirement	All along the project road section	Preparation of CESMPs	Prepare CESMPs including alignment sheets.	CESMP	Contractor to prepare CESMPs including alignment sheets. Engineer to review and approve CESMPs	Obligation of the contractor covered under BOQ-OPBRC

[6] Borrow pits include river sand and gravel extraction sites

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
		Incorporation of Items into Bid Documents	A specific environmental and social section will be included within the main Bid Documents indicating that the Contractor will be responsible for conforming with the requirements of the ESMP.	Bid documents	MPWT to ensure ESMP is included within Bid Documents.	N/A
	**ESS2 Labor and Working Conditions**					
Employment	All along the project road section	Employment conditions not aligned with ESS	Contractor to follow requirements of LMP	LMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Supply Chain	All along the project road section	Ensuring ESS compliance in the supply chain	Per the LMP, the Contractor shall be responsible for conducting due diligence on the primary supply workers (those providing key materials for road construction, in particular raw materials), to ensure there is no indentured/forced or child labour (as per the Labour Law 2013). Specific measures relating to the requirements of the due diligence per the LMP shall be followed.	LMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Workers' Rights and Occupational Health and	All along the project road section	Worker Health and Safety	Prepare an Occupational Health and Safety Plan (OHS Plan) including the elements specified in the Project ESIA. Ensure that sub-contractors are provided with copies of the CESMP.	OHS Plan / ESMP	Contractor to prepare OHS Plan. Contractor to provide copies of the CESMP to sub-	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
Safety (OHS)					contractors prior to their access to the site. Engineer to review and approve OHS Plan.	
			Initial Safety & Conduct Induction Course: All workmen will be required to attend a safety and conduct induction course before they are allowed access to the Site. The induction shall cover the contents of the OHS Plan, LMP and the Code of Conduct.	OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Traffic Safety	Submit a Traffic Management Plan (TMP) to PMU and local traffic authorities prior to mobilization.		Contractor to prepare TMP. Engineer to approve TMP.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	UXO	Prior to the start of any works the Contractor will consult with the relevant regulatory authorities to confirm that the construction area is clear of any UXO. If this cannot be confirmed the Contractor (through an approved sub-contractor) will be responsible for surveying the construction areas (including ancillary facilities, such as borrow pits and access roads) and confirming that the work sites are free of UXO. The Contractor will provide, in writing, the findings of the survey to the Engineer. If any UXO is found on site the Contractor, through his approved		Contractor to consult with relevant regulatory authorities. Sub-contractor to survey the site, if required. Contractor to provide the results of the survey to the Engineer.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
			sub-contractor, will be responsible for removing any UXO.			
	**ESS3 Resource Efficiency and Pollution Prevention and Management**					
Air Quality	All along the project road section	General construction impacts	Preparation of an Air Quality Plan (AQP) including the location of haul routes and other elements as specified in the Project ESIA.	CSEMP AQP	Contractor to prepare AQP Engineer to review and approve AQP.	Obligation of the contractor covered under BOQ-OPBRC
	Construction camps	Energy supply	Consideration should be given to the use of energy from the following sources (in order of preference): • Renewable (solar) – Energy requirements for construction camps should be supplied via renewable solar power energy. These can easily be placed on the roofs of camp facilities. • Low Emissions (and low noise) Generators – Low emissions, energy efficient generators are now available on the market that comply with EU Stage V (Regulation 2016/1628) emissions standard for non-road mobile machinery (NRMM).	CSEMP AQP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Quarry and borrow pit locations (to be determined)	Air quality impacts from stationary sources	Locations for quarry sites, borrow pits and concrete batching plants will require approval from the Engineer and PONRES. No quarry, borrow pit or batching plant will be located within 2 km of protected areas or within 500 meters of sensitive receptors or urban areas.	CSEMP AQP	Contractor to select sites. Engineer and PONRE to approve sites.	Obligation of the contractor covered under BOQ-OPBRC
Hydrology	All along the project road section	General construction impacts	Prepare and implement a Pollution Prevention Plan (PPP). The plan must provide details on wastewater (sewage) volume, disposal scheme, information on capacity and type of wastewater treatment facility, location of the discharge point/points with indication of coordinates.	PPP & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	Bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 29+400 (Nam Sat) 35+080 (Nam Met)	Bridges	Prepare and implement Bridge Construction Plan (BCP) – outlining the schedule of bridge construction and environmental management measures for each bridge location, including protection of biodiversity.	BCP & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone) 125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka)					
	Camp sites (locations to be determined)	Camp sites water management	Prepare and implement a Construction Camp Management Plan (CCMP) which will form part of the CESMP. The Plan, which will include all of the water management requirements of the ESIA, will indicate the system proposed and the locations of related	CCSP & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
			facilities in the site, including latrines, holding areas, septic tanks, etc.			
	Camp sites (locations to be determined)	Siting of facilities	Site plans will be devised to ensure that, insofar as possible, all temporary construction facilities are located at least 100 meters away from any surface water course.	CCMP & CESMP	Contractor to select sites. Engineer and PONRE to approve sites.	N/A
Soils	As identified in the RAP	Loss of productive soils	Compensation payments for loss of land completed according to RAP requirements	RAP	MPWT	Per RAP
	All along the project road section	Emergencies	Prepare and implement an Emergency Response Plan (ERP), which will cover containment of hazardous materials, oil spills, and work-site accidents and will be applicable to all phases of the Project. Specific requirements of ERP per the ESIA shall be included.	ERP & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Topsoil	Prepare and implement a topsoil management plan (TSMP) in accordance with the requirements of the ESIA.	TSMP & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	Within 2km of protected areas or within 500 m of urban areas and sensitive receptors	Suitability of borrow pits	No Project borrow pits will be utilized that are located within 2km of protected areas or within 500 m of urban areas and sensitive receptors.	ESMP	Contractor to select sites. Engineer and PONRE to approve sites.	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Within 2km of protected areas or within 500 m of urban areas and sensitive receptors	New Quarry Sites	Any new quarries must obtain the required permits prior to commencement of works at these sites, this will include approval from PONRE and the Engineer. No quarry will be located within 500 meters of any urban area, sensitive receptor or within 2 kilometers of a protected area.	ESMP	Contractor to select quarry sites and apply for approval from PONRE and any other regulatory agencies as necessary. Engineer to review quarry locations, licenses and approvals from PONRES.	Obligation of the contractor covered under BOQ-OPBRC
	Quarry 1 – 8+000 Quarry 2 – 52+000 Quarry 3 – 92+400 Quarry 4 – 116+000 Borrow Pit 1 – 8+100 Borrow Pit 2 – 20+200 Borrow Pit 3 – 24+200 Borrow Pit 4 – 60+00	Existing Borrow Pits	For all existing borrow pits/quarries proposed for use by Contractor, a due diligence review including a review of borrow pits/quarry locations, licenses and approvals from PONRES and other regulatory agencies will be carried out by the Engineer during project implementation (pre-construction phase) to determine their suitability and ensure that the borrow pits/quarries are not within 2 kms from protected areas; and not within 500 meters from sensitive receptor. For all existing borrow pits/quarries, the Engineer will consult with PONRES to confirm the exact distance from protected areas and to ensure the borrow pits are not located within 2 kms from protected areas; and not within 500 meters from sensitive receptor.	ESMP	Engineer to undertake due diligence review. Results of the due diligence review will be presented to ESMU and Contractor clearly stating the reasons for any rejection of the site.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Borrow Pit 5 – 86+000 Borrow Pit 6 – 90+150 Borrow Pit 7 – 116+400		The due diligence review will be undertaken before the Contractor signs any contract with the existing borrow pit owner. Include a review of the potential impacts of the borrow pits and quarries on surface and groundwater. Where potential impacts are identified the borrow pit will be excluded from use. For new borrow pits, the Contractors borrow pit action plan shall assess potential hydrological impacts on the surrounding environment and local community and provide necessary mitigation measures for any significant issues identified.			
	All along the project road section	New Borrow Pits	Obtain all necessary permits from the regulatory authorities. Prepare a Borrow Pit Action Plan (BAP). The contents of the plan shall include at least the following: • Total volume of gravel and sand extraction to be undertaken • Identify the corresponding length, breadth and depth of the river/ area over which the extraction is likely to be undertaken • Prepare an extraction plan • Define locations of the proposed stockpiles of extracted materials and the proposed working area for loaders and trucks • Identify location of vehicular access	ESMP / BAP	Contractor to select borrow sites and apply for approval from PONRES and any other regulatory agencies as necessary. Engineer to review borrow locations, licenses and approvals from PONRE.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
			• Vegetation and river bank protection measure and • site reclamation plan No borrow pit will be located within 2 kilometers of a protected area. Arrangements for opening and using material borrow pits will contain enforceable provisions.			
Waste Management	All along the project road section	Management of waste materials	Preparation and implementation of a waste management and recycling plan (WMRP)	WMRP & CESMP	Contractor to prepare Plan Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC
	All camp sites (locations to be determined)		Preparation of a construction camp management plan to manage liquid wastes.	CCMP & CESMP	Contractor to prepare Plan Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC
	Waste Management Contractors sites (to be determined)		Perform a due diligence review of the waste management contractors' facilities to ensure that they follow Lao PDR regulatory requirements.	WMRP & CESMP	Engineer to undertake due diligence review.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
Construction Camps and Plant	All along the project road section and camp sites (location to be determined)	Selection of Construction Camp Site	Preparation of a Spills Response Plan (SRP). Coordinate all construction camp activities with neighboring land uses.	CCMP, CESMP & SRP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Noise and Vibration	All along the project road section with special attention to sensitive receptors: **Schools:** 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200	Vibration	Preparation and implementation of a Construction Vibration Management Plan (CVMP)	CVMP & CESMP	Contractor to prepare Plan Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC
			Pre-condition surveys of properties.	CVMP & CESMP	Contractor & Engineer	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	132+800 133+900 134+000 **Markets:** 10+500 82+300 85+900 86+400 **Health Facilities:** 59+500 59+500 89+300 102+800					
	**ESS4: Community Health and Safety**					
Community Health and Safety	All along the project road section with special attention to sensitive receptors:	Traffic Management	Preparation and implementation of a TMP that outlines how issues relating to transport of materials and staff, road closures, diversions, safety signs, etc. will be managed	TMP	Contractor to prepare Plan Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	Schools: 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000 **Markets:** 10+500 82+300 85+900 86+400 **Health Facilities:**	General Safety	Preparation and implementation of a Community Health and Safety Plan (CHSP)	CHSP	Contractor to prepare Plan Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	59+500 59+500 89+300 102+800 **Bridges with Diversions:** 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun)					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	100+449 (Nam Yone) 129+403 (Nam Saneub) 132+569 (Nam Kasan)					
	All along the project road section	Safe Access	Consultation with the community and affected persons shall be completed before construction in affected zones occurs to ensure that the community are aligned and in agreement with the proposed access solutions.	CESMP SEP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Scheduling of Works	The schedule for civil works will be divided into sections comprising several work sites each with specific arrangements custom designed for the affected community. Contingencies for unaccounted disturbances to scheduling will be included in the works schedule.	Contract Documents	Contractor	N/A
Infrastructure	All along the project road section	Damage to roads	Prior to the commencement of works a road condition survey will be undertaken by the Engineer to record the condition of access roads to borrow pits, asphalt plants, camps, etc.	CESMP	Engineer to complete road condition survey.	Obligation of the contractor covered under BOQ-OPBRC
	Xai District	Electricity poles	Public utility relocation will be done with good coordination and contract preparation upfront to avoid delay of works and poor relocation planning.	CESMP	Contractor in coordination with utilities provider	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	**ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**					
Land Use	All along the project road section	Resettlement and compensation	RAP implemented prior to the start of construction	RAP	MPWT	Per RAP
	All along the project road section with special attention to roadside markets / vendors: 10+500 82+300 85+900 86+400	Roadside Vendors	Set aside specific areas for road vendors to continue to operate throughout the construction phase. The area should be located within at least 50 meters of the project road and should be sized to accommodate all road vendors. The site should be clearly signposted for traffic and an all-weather track provided to the site with parking space.	ESMP	Contractor & MPWT	Obligation of the contractor covered under BOQ-OPBRC
	Xai District	Electricity Poles	Cash compensation for cost to dismantle, transfer and rebuild for poles to be covered by engineering work construction Contractors	RAP	Contractor & MPWT	Obligation of the contractor covered under BOQ-OPBRC
	**ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**					
Designated Sites	At locations specified in the BMP (generally	General impacts	Implement the requirements of the Project BMP.	BMP	Contractor	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
	within 5km of Phou HiPhi NPA)					covered under BOQ-OPBRC
Flora and Fauna	Per locations specified in the Project ESIA	Tree cutting	Tree cutting and tree replanting will be undertaken according to the law of the GoL.	BMP	Contractor to undertake tree cutting. Relevant regulatory Authority (District Forest Office) to monitor tree cutting.	Obligation of the contractor covered under BOQ-OPBRC
	**ESS8: Cultural Heritage**					
Cultural Heritage	All along the project road section	Chance Finds	The Contractor will prepare a chance find procedure in line with the requirements of the GOL.	Chance find procedure	Contractor to prepare Plans Engineer to review and approve Plans.	Obligation of the contractor covered under BOQ-OPBRC
	Beng Cemetery	Grave removal	The loss of land of the cemetery in Beng will be compensated per the RAP. Based on the RAP entitlement matrix, compensation for the removal, excavation, relocation, reburial and other related costs, such as required ceremony, will be paid in cash to each affected family. Consultation will be carried out with the religious leaders, village authorities and	RAP	MPWT	Per RAP

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
			community members on the impacts on grave yard and relocated of the remains of the graves to other area of the grave yard which is about 14. 2 ha. From the project side it will be the representatives from Oudomxay grievance committee including Lao Front for National Development and PTI. Process of organizing ritual ceremony will be discussed and the relocation area will be agreed with the affected households. After reaching the agreement a minutes of meeting will be signed and certified by the village authorities. the heads of each affected household will also sign the compensation agreement for relocation of the remains of the dead. The duration of the ritual ceremony will be discussed with the religious leaders. Normally the ritual ceremony will include slaughtering of a cattle or buffalo depending on the severity of the impacts			
	ESS10: Stakeholder Engagement and Information Disclosure					
Stakeholder Engagement	All along the project road section	Stakeholder consultations	Four weeks prior to the Contractor starting works in any village or town he will be responsible for holding a works orientation meeting within the village / town and will invite members of the public and village officials. The purpose of the meeting is to summaries the scope of works, the schedule and to provide copies of the GRM.	SEP / ESMP	Contractor	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan/s	Responsibilities	Cost
Greivances	All along the project road section	No GRM in place	The GRM will be established and communicated to the local community prior to the commencement of works.	GRM	EDPD/PTI	N/A
	Other Non-ESS Issues					
Economy	All along the project road section with special attention to roadside markets / vendors: 10+500 82+300 85+900 86+400	Access	Prior to the start of works in any location prepare dedicated temporary pathways to all businesses that might otherwise be cut off from the road during the construction phase. The pathways must be wide enough to allow access to the business and must be kept free of mud and construction debris and should not be liable to flooding.	ESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Table 15: Environmental and Social Management Plan - Construction Phase

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	**ESS2 Labor and Working Conditions**					
Employment	All along the project road section	General Labour and working conditions	Implement the measures outlined in the Project Labour Management Plan (LMP)	LMP	Contractor	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
						covered under BOQ-OPBRC
	All along the project road section	Use of Local Labour	Unskilled labour force - the Contractor will be instructed to place emphasis the labour force within the project area to minimize on the labour force immigration into the project area. The contractor is encouraged to hire local female labour where is feasible. Skilled labour – the Contractor/Consultant will be advised to follow a recruitment procedure applied by WB and EIB as stated in the LMP. The Contractor/Consultant will have to demonstrate these required procedures. The Contractor/Consultant is recommended to employ local laboratory staff where necessary based on skilled and availability of labour force.	LMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Child Labour	The Contractor will ensure that no persons under the age of 18 are employed on the Project.	LMP	Contractor to implement mitigation	N/A
	All along the project road section	Labour Influx	Labour influx impacts shall be managed according to the requirements of the LMP.	LMP	Contractor to implement mitigation	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Workers' Rights and Occupational Health and Safety (OHS)	All along the project road section	Risk Assessment	Risk Assessment and Risk Register to enable the safe systems of work to be identified and any PPE requirements ascertained.	OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Training	Safety Training Program. A Safety Training Program is required and will consist of: • Initial Safety Induction Course • Periodic Safety Training Courses • Safety Meetings • Safety Inspections. • See ESIA for full training requirements.	OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Accidents	Keep a log of both training records and safety incidents including near misses.	OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC
			Audits and inspections of Contractor's accident logs. The Engineer should review and critique, in a timely manner, regular reports and incident reports submitted to the Engineer and to provide advice to ensure the accuracy and efficacy of the documentation.	ESMP	Engineer	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	PPE	Workers will be provided (before they commence works) with appropriate PPE suitable for electrical work such as safety boots, helmets, gloves, protective clothes,	OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			goggles, and ear protection at no cost to the workers.			
	Camp sites (locations to be determined)	Unfit worker Accommodation	All measures outlined in the LMP relating to accommodation will be implemented. Accommodation provided shall follow the benchmarks outlined in the IFC / EBRD Workers Accommodation: Processes and Standards Guidance Note. The note contains standards for general living facilities, dormitory facilities, sanitary and toilet facilities, canteen, cooking and laundry facilities and medical facilities.	LMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	HIV / AIDS	Subcontract with a Service Provider to provide an HIV Awareness Program to the Contractor's Personnel and the Local Community. Repeat the HIV Awareness Program at intervals not exceeding four months	OHS Plan	Contractor to implement mitigation. Service Provider to implement training. Engineer to review program.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Worker Health & safety	All construction plant and equipment used on or around the Site will be fitted with appropriate safety devices. These will include but not be limited to: • Effective safety catches for crane hooks and other lifting devices, and		Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			• Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists. Zones with noise level above 80 dBA must be marked with safety signs and appropriate PPE must be worn by workers above 85 dBA. Portable toilet facilities for workers at road work sites will be provided, where possible separate for male and female. Fencing on all areas of excavation greater than 2m deep will be installed along with warning signs. Supports will be fitted in all excavated areas. Keep air inlet filters clean and free of dust and microorganisms. Ensure reversing signals are installed on all construction vehicles. Implement fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening in a work surface. Note: fall prevention/protection measures may include, if unavoidable, the installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area, proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety harnesses and lanyard travel limiting devices to prevent access to fall hazard, fall			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			protection devices such as full body harnesses, etc. Mark the areas where risk of injuries from falling objects exist with rope or flagging to minimize risks and injuries. Provide spotters. Employ flag persons to control traffic when construction equipment is entering or leaving the work area. A suitably staffed and equipped health clinic for all workers is to be provided on site. First aid kits (compliant with OSHA standard 1910.266 App. A) will be provided at all work sites.			
	All along the project road section	Sub-contractor H&S	All sub-contractors will be supplied with copies of the CESMP. Provisions to be incorporated into all sub-contracts to ensure the compliance with the CESMP. All sub-contractors will be required to appoint a safety representative who will be available on the Site.	CESMP	Contractor to provide CESMP. Sub-contractors to ensure compliance with CESMP	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Vector borne disease	Effective measures will be used to ensure that water stagnant is not present around the camp site. Use of pesticides for vegetation control is prohibited. Workers will be given awareness training relating to vector born disease and posters	OHS Plan	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			will be located around work sites warning workers of the potential health risks. Medicines for the treatment of vector borne diseases will be provided at the camp medical facility.			
	All along the project road section	COVID	The Contractor shall follow the national regulations and guidelines relating to COVID-19.	OHS Plan	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	UXO	If any UXO is found on site the Contractor, through his approved sub-contractor, will be responsible for removing any UXO.	OHS Plan	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Grievances	A worker grievance redress mechanism (GRM) will be prepared and all workers will be provided with information about the GRM as part of their induction training.	Workers GRM	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	Noisy work areas, e.g. excavations, piling, rock crushing, etc.	Noise	Zones with noise level above 80 dBA must be marked with safety signs and appropriate PPE must be worn by workers.	OHS Plan	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	**ESS3 Resource Efficiency and Pollution Prevention and Management**					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Air Quality	All along the project road section	Energy supply	Consideration should be given to the use of energy from the following sources (in order of preference): Renewable (solar) – Energy requirements for construction camps should be supplied via renewable solar power energy. These can easily be placed on the roofs of camp facilities. Low Emissions (and low noise) Generators – Low emissions, energy efficient generators are now available on the market that comply with EU Stage V (Regulation 2016/1628) emissions standard for non-road mobile machinery (NRMM).	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Open burning of waste materials	No burning of debris or other materials will occur on the at any camp or construction site.	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	Rock crushing plant (location to be determined)	Rock-crushing plant	Rock crushing plant equipment will be fitted with water sprinklers that will run continuously while the plant is operational.	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section with special attention to sensitive receptors:	Exhaust emissions from the operation of construction machinery	No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. Construction equipment will be maintained to a good standard and fitted with pollution	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	Schools: 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000 **Health Facilities:** 59+500 59+500 89+300		control devices regularly monitored by the Contractor and Engineer. Stationary emission sources, if used (e.g., portable generators, compressors, etc.) shall be positioned as far as is practical from sensitive receptors. At a minimum generator should be more than 50m from receptors.			
		Fugitive emissions	Dust control measures will be implemented on the main construction zones and haul routes and to 500 m from the camp and plant entrances. The Contractor will be required to have an adequate supply of bowsers and carry out watering for dust control at least once every two hours in these locations: in dry weather with temperatures of over 25°C, or in windy weather. Avoid overwatering as this may make the surrounding muddy. The plan for watering will be adjusted based on areas identified during works as being significant dust areas. Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency). A strict Project speed limit of 20km/hr. will be enforced for Project vehicles using unmade tracks and within Project construction zones.	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	102+800		Vehicles carrying fine aggregate materials will be sheeted to help prevent dust blow and spillages. Earthwork operation will be suspended when the wind speed exceeds 20 km/h in areas. Rock crushing plant equipment will be fitted with water sprinklers that will run continuously while the plant is operational.			
		VOCs	Hazardous materials stored and used on site with potential gas emissions (e.g., Volatile Organic Compounds) will be in well-ventilated, but secure low-risk areas, away from major transport routes and away from the site boundary (where possible). Volatile fuels and chemicals (including hazardous wastes) will be stored in sealed containers. On site storage of large quantities of volatile fuels will be avoided, equally prolonged exposure to direct sun and heat will be avoided. Fires and material burning will not be allowed on the Project site. Chemical storage areas will be purpose built and well maintained. A data log of all chemicals with MSDSs will be provided at the storage facility within easy access.			Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Hydrology	All along the project road section with special attention to sensitive receptors: **Irrigation Channels** **Flood prone areas:** 5+225 7+000 14+360 22+121 22+968 24+437 51+806 59+348 59+809 59+971 61+393 69+200 69+725 70+203 70+344	Drainage and Flooding	During the construction phase the Contractor will be required to construct, maintain, remove and reinstate as necessary temporary drainage works and take all other precautions necessary for the avoidance of damage to properties and land by flooding and silt washed down from the works. Arrange with the village representatives those works which might interfere with the flow of irrigation waters to be carried out at such times as will cause the least disturbance to irrigation operations. Should any operation being performed by the Contractor interrupt existing irrigation facilities, the Contractors will restore the irrigation appurtenances to their original working conditions within 24 hours of being notified of the interruption. The Contractor will also be responsible for ensuring that no construction materials or construction waste block existing drainage channels within the Project corridor. The channels shall be kept open at all times to avoid disruption.		Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	76+154 76+454 77+456 82+562 93+631 103+184 107+367					
	Bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 29+400 (Nam Sat) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng)	Bridge works	Divert the water flow near the bridge piers. Provide coffer dams, silt fences, sediment barriers or other devices to prevent migration of silt during construction within streams. Perform dewatering and cleaning of cofferdams to prevent siltation by pumping from cofferdams to a settling basin or a containment unit. Carry out construction works without interrupting the traffic on the Project Road with the provision of suitable diversions. Ensure no waste materials are dumped in the river, including re-enforced concrete debris. Place generators more than 20 meters from the river. Ensure that no concrete sludge waste is dumped in the river.			Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone) 125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka)		Carefully collect all polystyrene (from expansion joints) so that it does not litter the local environment. Ensure that no hazardous liquids are placed within 10 meters of the river. Provide portable toilets at bridge construction sites to prevent defecation by workers into the river. Ensure that workers are provided with correct PPE including harnesses. During piling works ensure that pumped water is filtered through a silt trap before being discharged to the river.			
	All along the project road section	Ground and surface water pollution.	Implementation of the specific mitigation measures outlined under Construction Camps, below. Provide portable toilet facilities for workers at road work sites.	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Water Supply	Only legally permitted water resources are used for technical water supply.	CESMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			If groundwater is to be used for drinking it will be tested to ensure that the water quality meets the Lao PDR drinking water standards.			
	Camp sites	Camp Management	Wastewater arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a way that will cause neither pollution nor nuisance. There will be no direct discharge of sanitary or wash water to surface water. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies will be prohibited. Liquid material storage containment areas will not drain directly to surface water (including wetlands and ponds). Lubricating and fuel oil spills will be cleaned up immediately and spill clean-up materials will be maintained (including spill kits) across the Contractors construction camp and ancillary facilities, e.g., asphalt plant. Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters. Discharge of sediment-laden construction water directly into surface watercourses or wetlands will be forbidden. Sediment laden construction water will be discharged into	PPP / CCMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			settling lagoons or tanks prior to final discharge. Spill clean-up equipment will be maintained on site. The following conditions to avoid adverse impacts due to improper fuel and chemical storage: • Fueling operations will occur only within containment areas. • All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing. The storage area will be located away from any watercourse or wetlands. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tanks. • Filling and refueling will be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids. • All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. • The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any drain or watercourses.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			• Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. • Should any accidental spills occur immediate cleanup will be undertaken and all cleanup materials stored in a secure area for disposal. Disposal of such will be undertaken by a waste management company contracted by the Contractor. The waste management company must have the required licenses to transport and dispose of hazardous waste before any such waste is removed from the site. The Contractor will keep copies of the company's licenses and provide waste transfer manifests at his camp site for routine inspection by the Engineer.			
	Bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 29+400 (Nam Sat)	River works	Consult with PONRES to establish the fish spawning periods and fish migration periods of special status species (including: *Cirrhinus cirrhosis* (VU), *Cyprinus carpio* (VU) – introduced non-native species, *Luciocyprinus striolatus* (EN), *Mystacoleucus lepturus* (VU), *Pseudohemiculter dispar* (VU) and *Wallago attu* (VU)) in relation to the bridge construction works to ensure that all works are undertaken in periods least likely to affect the fish spawning period.	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone) 125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka)					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Soils	All gas stations within 5m of the ROW.	Gas Stations	Physical site investigation should be done and if needed, soil sampling of the project road section to be excavated around gas stations. If analysis of samples shows elevated levels of contamination a plan will be prepared by the Contractor to dispose of any excavated materials in these areas as hazardous waste. The plan shall also include procedures for the safe handling and transport of the material.	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All new borrow pits (locations to be determined)	New Borrow Pits	Before the materials extraction the layer of top-soil (about 20 cm) will be removed to the side of excavation area and kept until the area works will be finalized. Top-soil stockpiles will be located at least 50 meters distance from any watercourses to avoid water siltation and obstruction. The height of stockpiles will not exceed three meters to avoid wind erosion and dust emissions. Provide an access road to the borrow site. All drivers will be instructed to use only this officially designated road. If the Engineer deems the site to be hazardous to the local community, he will request the Contractor to fence the site to prevent access and provide warning signs on the fencing. Due to the sensitivity of the borrow pit locations, borrow haul routes will follow	BMP	Contractor to select borrow sites and apply for approval from PONRES and any other regulatory agencies.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			established transport corridors/rights-of-way, to the extent that is practicable. Full site reinstatement will be undertaken by the Contractor to avoid landscape damage and habitat loss. Rehabilitation measures will include: Removing of all types of equipment from the site; Removing of all types of waste or/and polluted soil and materials if any exist; Slope stabilization measure such as re-covering with topsoil, and further seeding, grassing and planting of appropriate bushes or/and trees if reasonable. The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the Engineer will be required before final acceptance and payment under the terms of contracts. Additional borrow pits will not be opened without the restoration of those areas no longer in use.			
	All along the project road section	Contamination of Soils	All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing. The storage area will be located away from any watercourse or wetlands. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tank (or one	PPP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			tank if more than one tank is located in the bund). The construction camp maintenance yard will be constructed on impervious hard standing with adequate drainage to collect spills, there will be no vehicle maintenance activities on open ground. Filling and refueling will be strictly controlled and subject to formal procedures. Drip pans will be placed under all filling and fueling areas. Waste oils will be stored and disposed of by a licensed contractor. All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any soils. No bitumen drums or containers, full or used, will be stored on open ground. They will only be stored on impervious hard standing. Areas using bitumen will be constructed on impervious hard standing to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, will be stored on open ground. They will only be stored on impervious hard standing.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Areas using bitumen will be constructed on impervious hard standing to prevent seepage of oils into the soils.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section with special attention to landslide / erosion prone areas: 81+400-81+500 96+865-96+935 98+330-98+370 108+035-108+165 108+733-108+827 108+940-108+961 121+886-121+914 122+850-122+950 128+860-128+990 129+708-129+743	Soil Erosion	Material that is less susceptible to erosion will be selected for placement around culverts. Re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species of local flora; (ii) immediate re-vegetation of all slopes and embankments if not covered with gabion baskets; (iii) placement of fiber mats to encourage vegetation growth. The Engineer and the Contractor will both be responsible for ensuring that embankments are monitored continuously during construction for signs of erosion.	CESMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section	Topsoil	Locate topsoil stockpiles outside drainage lines and protect stockpiles from erosion; construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil; rip ground surface prior to the spreading of topsoil; and remove unwanted materials from topsoil such as roots of trees, rubble and waste etc. Confine operation of heavy equipment within the ROW, as much as possible, to avoid soil compaction and damage to privately owned land. If in case private lands are disturbed, the contractor should promptly inform the owner and agree on the ways to remedy the situation.	TSMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
Geohazards	All along the project road section	Forest fires	Training for staff in actions to take in the event of a forest fire, e.g., evacuation procedures and training relating to the prevention of fires at work sites.	ERP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Waste Management	All along the project road section	Recycling and re-use	Where possible, surplus materials will be reused or recycled. Used oil and grease will be removed from site and sold to an approved used oil recycling company.	WMRP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Spoil	Where spoil material is generated the Contractor will be responsible for preparing		Contractor to implement mitigation.	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			a method statement of the safe disposal of spoil material at approved locations. No spoil shall be removed from site until method statement specify the disposal locations and approvals has been reviewed and approved by the Engineer. Under no circumstances will the Contractor dump excess materials on private lands. Excess spoil will not be dumped or pushed into any river at any location. Prompt removal of mounds of construction materials and debris when work on the section is finished.			covered under BOQ-OPBRC
	All along the project road section	Inert Solid & Liquid waste	Provide refuse containers at each worksite. Maintain all construction sites in a cleaner, tidy and safe condition. Waste storage containers will be covered, tip-proof, weatherproof and scavenger proof. Train and instruct all personnel in waste management practices and procedures. Collect and transport non-hazardous wastes to all approved disposal sites.		Contractor to implement mitigation and conduct training.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section, with specific focus on old culverts and	Concrete	Waste concrete will be crushed and re-used as fill material, or base material where possible.		Contractor to implement any recommendations for re-use of asphalt.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	the following bridges: 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone) 129+403 (Nam Saneub)		Under no circumstances should concrete mixers be washed out onto open ground at construction sites, such as bridges. The existing pavement will be scarified, and where the material meets the required specification, it will be compacted and re-used as sub-base material.		Contractor to implement mitigation.	

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	132+569 (Nam Kasan)					
	All along the project road section	Hazardous Waste	Storage of hazardous waste will be in specific secure locations as identified by the waste management plan. Hazardous liquids must be stored within impermeable bunds. Collect and temporarily store used hazardous waste separately in specialized containers and place in safe and fire-free areas with impermeable floors roofs, at a safe distance from fire sources and according to the requirements of their MSDS. Training and suitable PPE will be provided to all personnel handling hazardous waste. Disposal of waste materials will be properly undertaken in-line with national regulatory requirements. Keep records of the types and volumes of waste removed from the site on a weekly basis.		Contractor to implement mitigation. .	Obligation of the contractor covered under BOQ-OPBRC
Construction Camps and Plant	All along the project road section	Camp site pollution	Rain-water run-off arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The drainage system will be fitted with oil and grease interceptors.		Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			There will be no direct discharge of sanitary or wash water to surface water. In the absence of functioning sewerage and sewage treatment facilities it is recommended that the Contractor provides his own on-site wastewater treatment facilities. For sites servicing a small number of employees (less than 150), septic tanks may be used. For larger sites, liquid wastes will as a minimum receive primary treatment in anaerobic tank or pond preceded by a bar screen to remove large solid objects (e.g., sticks, rags). Primary treatment (also referred to as clarification, sedimentation or settling) is the process where wastewater is allowed to settle for a period (around 2 hours) in a settling tank. This leads to separation of a liquid effluent which includes oils and grease and a liquid-solid sludge. Primary treatment leads to reduction in suspended solids, biological oxygen demand and removal of floating material (e.g., feces). There will be no direct discharge of untreated sanitary or oily wastewater to surface water bodies. Licensed contractors will be required to collect and disposal of liquid waste from the septic tanks on regular basis. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies will be prohibited. Liquid material storage containment areas will not drain directly to surface water.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Wastewater from vehicle washing bays will be free of pollutants if the wash bay has been constructed correctly. Lubricating and fuel oil spills will be cleaned up immediately and spill cleanup materials will be maintained at the storage area. Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks, or wastewater treatment facilities. Discharge of sediment-laden construction water directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge. Washing out concrete trucks at construction sites will be prohibited unless specific concrete washout areas are provided for this purpose at the construction site. The washouts will be impermeable and emptied when 75% full. Spill cleanup equipment will be maintained on site (including at the site maintenance yard and vehicle fueling areas). The following conditions to avoid adverse impacts due to improper fuel and chemical storage: • Fueling operations will occur only within containment areas. • All fuel and chemical storage (if any) will be sited on an impervious base within a bund and secured by fencing.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			The storage area will be located away from any watercourse or wetlands. The base and bund walls will be impermeable and of sufficient capacity to contain 110% of the volume of tanks. • Filling and refueling will be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids. • All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. • The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any drain or watercourses. • Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. • Should any accidental spills occur immediate cleanup will be undertaken, and all cleanup materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All camp sites (locations to be determined)	Camp site decommissioning	Maintain and cleanup campsites and respect the rights of local landowners. If located outside the RoW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined period.	CCMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All batching plants (locations to be determined)	Pollution and Emissions from Concrete Batching Plants	To limit impacts from dust, the following conditions will apply: • Batching plants will be located downwind of urban areas. • The entire batching area traversed by vehicles – including driveways leading into and out of the area – will be paved with a hard, impervious material. • Sand and aggregates will be delivered in a dampened state, using covered trucks. If the materials have dried out during transit they will be re-wetted before being dumped into the storage bunker. • Sand and aggregates will be stored in a hopper or bunker which shields the materials from winds. The bunker should enclose the stockpile on three sides. The walls should extend one meter above the height of the maximum quantity of raw material kept on site and extend two meters beyond the front of the stockpile. • The hopper or bunker will be fitted with water sprays which keep the stored		Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			material damp at all times. Monitor the water content of the stockpile to ensure it is maintained in a damp condition. • Overhead storage bins will be totally enclosed. The swivel chute area and transfer point from the conveyor will also be enclosed. • Rubber curtain seals may be needed to protect the opening of the overhead bin from winds. • Conveyor belts which are exposed to the wind and used for raw material transfer will be effectively enclosed, to ensure dust is not blown off the conveyor during transit. Conveyor transfer points and hopper discharge areas will be fully enclosed. • Conveyor belts will be fitted with belt cleaners on the return side of the belt. • Weigh hoppers at front end loader plants will be roofed and have weigh hoppers shrouded on three sides, to protect the contents from the wind. The raw materials transferred by the front-end loader should be damp, as they are taken from a dampened stockpile. • Store cement in sealed, dust-tight storage silos. All hatches, inspection points and duct work will be dust tight. • Cement dust emissions from the silo during filling operations must be			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			minimized. The minimum acceptable performance is obtained using a fabric filter dust collector. • Totally enclose the cement weigh hopper, to ensure that dust cannot escape to the atmosphere. • An inspection of all dust control components will be performed routinely – for example, at least weekly. • All contaminated storm water and process wastewater will be collected and retained on site. • All sources of wastewater will be paved and bunded. The specific areas that will be paved and bunded include; the agitator washout area, the truck washing area, the concrete batching area, and any other area that may generate storm water contaminated with cement dust or residues. Contaminated storm water and process wastewater will be captured and recycled by a system with the following specifications: • The system's storage capacity must be sufficient to store the runoff from the bunded areas generated by 20 mm of rain. • Water captured by the bunds will be diverted to a collection pit and then pumped to a storage tank for recycling.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			• An outlet (overflow drain) in the bund, one meter upstream of the collection pit, will divert excess rainwater from the bunded area when the pit fills due to heavy rain (more than 20 mm of rain over 24 hours). • Collection pits should contain a sloping sludge interceptor, to separate water and sediments. The sloping surface enables easy removal of sludge and sediments. • Wastewater will be pumped from the collection pit to a recycling tank. The pit will have a primary pump triggered by a float switch and a backup pump which automatically activates if the primary fails. • Wastewater stored in the recycling tank needs to be reused at the earliest possible opportunity.			
	All asphalt plant (locations to be determined)	Asphalt Plant	Emissions & Noise: • Asphalt plants will be located downwind of residential areas and not within 100m of any residential area. • Adequate Personal Protective Equipment (PPE) will be provided to staff working in areas of high noise and emissions. Storage and Use of Hazardous Materials (including bitumen):	PPP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			• Ensure all hazardous materials are stored (including within suitable sized bunds for liquids), handled and disposed of according to their Material Safety Data Sheet (MSDS). • Copies of MSDS will be kept on site with all hazardous materials. • The Contractor will keep a plan of site indicating where all hazardous materials are stored. Vehicle Movement: • The Contractor will include the asphalt plant in his Traffic Management Plan, including haul routes from the plant. Health and Safety: • To prevent bitumen burns it will be compulsory for the workers handling hot bitumen to wear full-body protection. • All transportation, handling and storage of bitumen will be handled safely by experienced personnel. • The dust from the manufacturing process may pose respiratory hazards, hence protective air mask will be provided to the operators for the loading and unloading of aggregates. • Hearing protectors will be provided those working on the plant.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			• First Aid kits (compliant with OSHA standard 1910.266 App. A) will be available on site for the workers in case of emergency. The MSDS for each chemical product will be made accessible onsite and displayed. If the Contractor chooses to use existing asphalt and concrete batching facilities the following conditions shall apply: The Contractor shall undertake an initial environmental and social audit of the facility to ensure that: • The facility has a license to operate in the location. • Air emissions and noise are not impacting upon sensitive receptors • Waste materials are being managed appropriately • Wastewater discharge is adequately controlled, and no contaminated water is being discharged from the site. • All staff are wearing appropriate PPE. The results of the audit will be submitted to the CSC for review before any site is used. The audit shall be repeated on a six-monthly basis.			
	All Along the project road	Construction Noise	All exhaust systems will be maintained in good working order; properly designed	PPP	Contractor	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Noise and Vibration	section with special attention to sensitive receptors: **Schools:** 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000 **Health Facilities:** 59+500 59+500		engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken. Stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible. No rock crushing plants, or any long-term generators of significant noise will be allowed that are located within 500 meters of sensitive receptors or urban areas. Operations will be scheduled to coincide with periods when people would least likely be affected; work hours and workdays will be limited to less noise-sensitive times. Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential areas, medical facilities, educational facilities, and religious temples the Contractor's hours of working will be limited to 8 AM to 6 PM. During religious holidays the Contractor will not work within 250 meters of any temple. Public notification of construction operations will incorporate noise considerations.			covered under BOQ-OPBRC
		Vibration	Where the results of the vibration monitoring show that the specified construction vibration limit is reached at a particular location, the	CVMP	Contractor	Obligation of the contractor

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	89+300 102+800 **Bridge Locations (piling impacts):** 0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Huay Lamad) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 84+390 (Nam Kao) 86+655 (Nam Kham) 89+710 (Nam Oun) 100+449 (Nam Yone)		Contractor shall suspend the construction activities that generate the excessive vibration at such location, notify the Engineer and with the approval of the Engineer take mitigative actions necessary to keep the construction vibration within the specified limit. This may, for example include: • The use of low roller vibration settings and performing compaction without vibration. • The use of low vibration piling techniques. • Provide temporary vibration barriers in sensitive locations.			covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	129+403 (Nam Saneub) 132+569 (Nam Kasan)					
	**ESS4: Community Health and Safety**					
Community Health and Safety	All along the project road section with special attention to sensitive receptors: **Schools:** 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200	Road closures, diversions and blocking of access routes	Provision of all road diversion signs and ensure that diversion roads do not impact negatively upon private lands. Any diversions will be agreed upon by the Engineer. All access routes will be kept open during Project works for at least 50% of the day during construction works and 100% of the time after construction works are completed for the day.	CHSP / TMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
		Access	Provide safe access at all times through the construction site to people whose residences/shelters and routes are temporarily severed by road construction.	CHSP / TMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
		Traffic safety	Submit a Traffic Management Plan to local traffic authorities and the Engineer prior to mobilization and include the plan as part of his CESMP;.	CHSP / TMP / SEP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	94+900 105+500 128+200 132+800 133+900 134+000 **Markets:** 10+500 82+300 85+900 86+400 **Health Facilities:** 59+500 59+500 89+300 102+800		Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions. Allow for adequate traffic flow around construction areas. Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control. Provide temporary access where accessibility is temporarily restricted due to civil works. Ensure that access routes, via diversions, always remain open to businesses, residential properties, schools, medical facilities, the airport, etc. Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions. Allow for adequate traffic flow around construction areas. The signs should be visible day and night and sufficiently installed. Given that there is no by-pass road, installation of suitable physical demarcation between working areas and the carriageway open to traffic is a must. Provide for road safety campaigns and enforcement of road safety regulations.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control. Access roads for borrow pits, batching plants, etc., should be maintained during the construction phase and rehabilitated at the end of construction.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	Schools: 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000	Educational Facilities	Place warning signs outside of each school to alert construction vehicles of their locations and to be aware of children crossing the road in these areas. At least two weeks before construction starts within the vicinity of all schools, the Contractor will be responsible for informing the School of the works program and schedule so that the school can inform pupils of the impending works and to be vigilant throughout the construction program. If warranted, the Engineer may recommend that the Contractor places protective barriers in-front of school entrances to prevent children rushing out from the school gates into the path of construction vehicles or works. When working in the immediate vicinity of a school, the Contractor will cease works for at least 30 minutes before school starts and after it closes to allow children to leave the area safely and to allow parents safe access to collect their children.	CHSP /TMP	Contractor to implement mitigation. Contractor to provide letters to schools to Engineer to confirm that the schools have been informed of impending works.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Infrastructure	All along the project road section and electricity poles in Xai District	Electrical Systems and water pipes	During construction all power lines (transmission and distribution) and water pipes in the Project Corridor will be kept operational, this will include temporary transmission lines while existing poles and lines are moved. If any unforeseen temporary disruption to water or power supplies caused by construction activities is absolutely necessary the Contractor must warn the affected population and receive approval from the Engineer for the disruption at least 24 hours in advance and no disruption will last longer than 4 hours.	CESMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Traffic safety	Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions. Allow for adequate traffic flow around construction areas; Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control; Provide temporary access where accessibility is temporarily restricted due to civil works; and Ensure that access routes, via diversions, always remain open to businesses, residential properties, schools, medical facilities, the airport, etc.	CESMP TMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	**ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**					
Land Use	All along the project road section with special attention to roadside markets / vendors: 10+500 82+300 85+900 86+400	Accessibility	The Contractor must prepare dedicated temporary pathways to all businesses that might otherwise be cut off from the road during the construction phase. The pathways must be wide enough to allow access to the business and must be kept free of mud and construction debris and should not be liable to flooding.	TMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Temporary land Use	Temporary land acquisition (e.g. for stockpiles, camps, etc) and compensation provided, will be in line with the entitlements in the RAP (where it is compulsory, as in the contractor needs a specific location/ This does not apply if it is "negotiated" and the contractor can find a location elsewhere)	RAP	Contractor to implement mitigation.	Per the RAP
Econony	All along the project road section with special attention to roadside markets / vendors:	Access	Access to businesses must be always maintained throughout the construction period.	CESMP & RAP	Contractor	Obligation of the contractor covered under BOQ-OPBRC/ RAP Costs

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	10+500 82+300 85+900 86+400		Prepare dedicated temporary pathways to all businesses that might otherwise be cut off from the road during the construction phase. The pathways must be wide enough to allow access to the business and must be kept free of mud and construction debris and should not be liable to flooding. Contract term for Contractor to ensure alternative access to houses as soon as possible after the start of the excavation work during the civil works The Contractor shall be responsible for compensation for the impacts on PAHs' livelihood and businesses due to his failure to maintain/provide access facilities and the prolonged access lost (beyond the agreed work schedule). A clause on these measures will be specified in the bidding document including the BOQ form and the work contract			
	**ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**					
Designated Sites	At locations specified in the BMP (generally within 5km of Phou HiPhi NPA)	Poaching and encroachment	Implementation of a strict code of conduct with regards to treatment of local fauna which will include a prohibition of poaching which will be a sackable offence. Workers are to be clearly informed the environmental rules of conduct, along with the penalties for non-compliance, to be prohibited from	BMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			buying/selling, eating of wildlife, and burning of natural vegetation, anywhere in or near the project area. Project staff and contractors will be banned from hunting, fishing, buying and collecting natural resources (e.g., wildlife, aquatic animals, fish) within the project area including rivers to minimize impacts to fauna and their habitats.			
	All along the project road section	General measures	Ensure compliance with Project BMP	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Flora and Fauna	All along the project road section	Vegetation clearance	No chemicals will be used to clear vegetation.	BMP	Contractor to implement mitigation.	No Cost
	All along the project road section	Natural Habitat & Threatened species	An ecologist will be on hand to supervise the habitat (tree and bushes) clearance works and provide advice to the workforce. Vegetation located on the steep slopes of mountains within the project area will also be preserved where possible to minimize the risk of erosion. Storage areas will be located in areas away from natural forest, headstreams and drainage.	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Controls of forest/bushfire including a Project ban on open-burning of waste.			
	All along the project road section	Noise and Vibration	Project construction will not be undertaken at dusk, dawn and at night to avoid disturbance to nocturnal and crepuscular fauna (i.e., bats, herpes) from increased noise and vibration.	BMP	Contractor	None
	All along the project road section	Poaching	Project staff and contractors will be banned from hunting, fishing, buying and collecting natural resources (e.g., wildlife, aquatic animals, fish) within the project area including rivers to minimize impacts to fauna and their habitats. Workers are to be clearly informed the environmental rules of conduct, along with the penalties for non-compliance, to be prohibited from buying/selling, eating of wildlife, and burning of natural vegetation, anywhere in or near the project area.	BMP	Contractor	None
	All along the project road section	Invasive species	A washdown procedure will be employed to prevent invasive weed spread and potential contamination of the project area from the receiving environment. Non-invasive local plant species will only be used for revegetation Best practice organic waste management procedures will be followed to avoid attracting pests.	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section	Tree planting	A planting scheme should be developed and implemented by the Project or the contractor in consultation with Project Management Unit (including Provincial/district Public Work and Transportation Division (PWT). The geocells geotextile along the escarpments and embankments will be seeded with grasses and herbs using native species of local provenance including nationally rare and threatened species.	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	**ESS7: Indigenous Peoples**					
Indigenous People	All along the project road section	Participation and inclusion	Participation of ethnic groups in monitoring the implementation of EGEP, Environment and Social Management Plan and Resettlement Action Plan.	EGEP	MPWT	None
	**ESS8: Cultural Heritage**					
Cultural Heritage	All along the project road section	Impacts to Historical and archeological areas	In the event of any chance finds during the construction works procedures will apply that are governed by GoL legislation and guidelines and as outlined in the Contractors Chance Find Procedure.	CESMP	Contractor to implement mitigation.	Obligation of the contractor covered under BOQ-OPBRC
	Temples:	Access	Contract term for Contractor to ensure alternative access to the temples and	RAP	Contractor	Per RAP

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	92+800 102+000 **Cemeteries:** 8+700 35+400-35+600 88+600-88+700 100+800 118+900		cemeteries as soon as possible after the start of the excavation work during the civil works			
	Temples: 92+800 102+000	Religious Holidays	During religious holidays the Contractor will not work within 250 meters of any temple.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	**ESS10: Stakeholder Engagement and Information Disclosure**					
Stakeholder Engagement	All along the project road section	Communication with stakeholders	Contractor will provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions through a rolling program of community meetings along the Project corridor as work progresses. The Contractor will also hold monthly community meetings in each village / town where construction works are on-going.	SEP /EGEP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Greivances	All along the project road section	Grievances from stakeholders and workers	Monitor and report on grievances per the GRM	GRM	EDPD/PTI	Obligation of the contractor covered under BOQ-OPBRC
Disclosure	All along the project road section	Monitoring reports	Disclose monitoring reports per WB requirements.	Contract Documents	Engineer & PMU	Obligation of the contractor covered under BOQ-OPBRC
	Other non-ESS issues					
Economy	All along the project road section	Schedule of works	The schedule for civil works be divided into sections comprising several work sites each with specific arrangements custom designed for the affected community. Contingencies for unaccounted disturbances to scheduling will be included in the works schedule.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Table 16: Environmental and Social Management Plan – Operational & Maintenance Phase

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	**ESS2 Labor and Working Conditions**					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Employment	All along the project road section	Use of local labour	As part of the maintenance of the road the Contractor should also look into the possibility of employing the local people for the maintenance of roadside drains upon completion of rehabilitation works.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Workers' Rights and Occupational Health and Safety (OHS)	All along the project road section	HIV / AIDS	Subcontract with a Service Provider to provide an HIV Awareness Program to the Contractor's Personnel and the Local Community. Repeat the HIV Awareness Program at intervals not exceeding four months	CESMP / OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Worker Health & safety	Safety Meetings conducted on a monthly basis. Incident and accident reporting Regularly inspect, test and maintain all safety equipment. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, will be repaired or replaced immediately.	CESMP / OHS Plan	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			All plant and equipment used on or around the Site will be fitted with appropriate safety devices. A fully equipped first aid base will be provided. Workers will be provided (before they commence works) with of appropriate PPE suitable for electrical work such as safety boots, helmets, gloves, protective clothes, goggles, and ear protection at no cost to the workers.			
	All along the project road section	Sub-contractor H&S	All sub-contractors will be supplied with copies of the CESMP. Provisions to be incorporated into all sub-contracts to ensure the compliance with the CESMP. All sub-contractors will be required to appoint a safety representative who will be available on the Site.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Vector borne disease	Medicines for the treatment of vector borne diseases will be provided.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section	COVID	The Contractor shall follow the national regulations and guidelines relating to COVID-19.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	**ESS3 Resource Efficiency and Pollution Prevention and Management**					
Air Quality	All along the project road section with specific attention to: **Schools:** 8+800 25+700 32+700 34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900	Exhaust emissions from the operation of machinery Fugitive emissions	No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. Equipment will be maintained to a good standard and fitted with pollution control devices regularly monitored by the Contractor and Engineer. All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	105+500 128+200 132+800 133+900 134+000 **Health Facilities:** 59+500 59+500 89+300 102+800					
Climate Change	All along the project road section with special attention to: **Flood prone areas:** 5+225 7+000 14+360	Additional impacts to project infrastructure	Monitoring of the mitigation measures during operation to determine their adequacy and if adaptive management measures are required.	OPBRC Contract	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	22+121 22+968 24+437 51+806 59+348 59+809 59+971 61+393 69+200 69+725 70+203 70+344 76+154 76+454 77+456 82+562 93+631 103+184 107+367 **Bridges:**					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	0+330 (Nam Mao 1) 10+240 (Nam Mao 2) 14+360 (Nam Kird) 20+050(Hua y Lamad) 29+400 (Nam Sat) 35+080 (Nam Met) 48+780 (Nam Lor) 57+340 (Nam Hao) 82+560 (Nam Beng) 84+390 (Nam Kao) 86+655 (Nam Kham)					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	89+710 (Nam Oun) 100+449 (Nam Yone) 125+892 (Nam Pha) 129+403 (Nam Saneub) 132+569 (Nam Kasan) 135+750 (Nam Ka) **Slope protection for landslide / erosion prone areas:** 81+400-81+500 96+865-96+935 98+330-98+370					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	108+035-108+165 108+733-108+827 108+940-108+961 121+886-121+914 122+850-122+950 128+860-128+990 129+708-129+743					
	All drainage structures, specifically those in flood prone areas: 5+225 7+000 14+360 22+121		Adequate and routine maintenance of the drainage system as a part of contractor's responsibilities under the OPBRC contract	OPBRC Contract	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	22+968 24+437 51+806 59+348 59+809 59+971 61+393 69+200 69+725 70+203 70+344 76+154 76+454 77+456 82+562 93+631 103+184 107+367					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Hydrology	All along the project road section	Drainage and Flooding	Should any operation being performed by the Contractor interrupt existing irrigation facilities, the Contractors will restore the irrigation appurtenances to their original working conditions within 24 hours of being notified of the interruption. During O&M phase the contractor shall ensure that all drainage channels are adequately maintained to prevent blockages and ensure the free flow of water away from the road and residential property / Land. The channels shall be kept open at all times to avoid disruption.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Water Supply	Only legally permitted water resources are used for technical water supply.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Soils	All along the project road section	Contamination of Soils	Filling and refueling will be strictly controlled and subject to formal procedures. Drip pans will be placed under all filling and fueling areas. Waste oils will be stored and disposed of by a licensed contractor.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			All valves and trigger guns will be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. The contents of any tank or drum will be clearly marked. Measures will be taken to ensure that no contaminated discharges enter any soils. No bitumen drums or containers, full or used, will be stored on open ground. They will only be stored on impervious hard standing. Areas using bitumen will be constructed on impervious hard standing to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, will be stored on open ground. They will only be stored on impervious hard standing. Areas using bitumen will be constructed on impervious hard standing to prevent seepage of oils into the soils.			

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section with special attention to: **landslide / erosion prone areas:** 81+400-81+500 96+865-96+935 98+330-98+370 108+035-108+165 108+733-108+827 108+940-108+961 121+886-121+914 122+850-122+950	Soil Erosion	Re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species of local flora; (ii) immediate re-vegetation of all slopes and embankments if not covered with gabion baskets; (iii) placement of fiber mats to encourage vegetation growth.		Contractor	

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	128+860-128+990 129+708-129+743					
Geohazards	All along the project road section	Earthquakes	Routine inspection of structures after earthquakes by MPWT.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Waste Management	All along the project road section	Recycling and re-use	Where possible, surplus materials will be reused or recycled. Used oil and grease will be removed from site and sold to an approved used oil recycling company.	WMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Spoil	Under no circumstances will the Contractor dump excess materials on private lands. Excess spoil will not be dumped or pushed into any river at any location.	WMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Inert Solid & Liquid waste	Provide refuse containers at each worksite. Maintain all work sites in a cleaner, tidy and safe condition.	WMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Waste storage containers will be covered, tip-proof, weatherproof and scavenger proof. Train and instruct all personnel in waste management practices and procedures. Collect and transport non-hazardous wastes to all approved disposal sites.			
	All along the project road section	Hazardous Waste	Storage of hazardous waste will be in specific secure locations as identified by the waste management plan. Hazardous liquids must be stored within impermeable bunds. Collect and temporarily store used hazardous waste separately in specialized containers and place in safe and fire-free areas with impermeable floors roofs, at a safe distance from fire sources and according to the requirements of their MSDS. Training and suitable PPE will be provided to all personnel handling hazardous waste.	WMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			Disposal of waste materials will be properly undertaken in-line with national regulatory requirements. Keep records of the types and volumes of waste removed from the site on a weekly basis.			
Noise and Vibration	All along the project road section	Elevated noise	Adaptive noise management measures as required during operational phase	CESMP	MPWT	Obligation of the contractor covered under BOQ-OPBRC
	**ESS4: Community Health and Safety**					
Community Health and Safety	All along the project road section with special attention to sensitive receptors: **Schools:** 8+800 25+700 32+700	Public safety	To complement the physical measures, the project will implement a program of public education and communication on road safety, targeting motorists and pedestrians throughout project implementation.	CESMP	MPWT	MPWT costs
		Road closures, diversions and blocking of access routes	Provision of all road diversion signs and ensure that diversion roads do not impact negatively upon private lands. All access routes will be kept open during Project works for at least 50%	TMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	34+600 52+800 60+100 64+200 65+700 72+100 93+200 94+900 105+500 128+200 132+800 133+900 134+000		of the day during works and 100% of the time after works are completed for the day.			
		Access	Provide safe access at all times through the work site to people whose residences/shelters and routes are temporarily severed by activities.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
		Traffic safety	Provide information to the public about the scope and schedule of activities and expected disruptions and access restrictions. Allow for adequate traffic flow around work sites. Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control.	TMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
		Noise	All exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			employed; and regular equipment maintenance will be undertaken. Stationary equipment will be placed as far from sensitive land uses as practical and provided with shielding mechanisms where possible. Work near Sensitive Receptors will be limited to short term activities. Work activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Contractor's hours of working will be limited to 8 AM to 6 PM.			
		Human Trafficking	Comprehensive outreach in raising awareness on human trafficking to the ethnic women and children in the project area using the information education communication materials already developed for anti-human trafficking by different projects. Contractor Code of Conduct need to be made aware to local people and	CESMP	MPWT / PTI	N/A

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
			participatory monitoring by local people shall be encouraged.			
			Continue to increase efforts to disseminate, implement, and train police and border officials on the national victim protection and referral guidelines.	None	GoL	N/A
Infrastructure	All along the project road section	Electrical Systems and water pipes	If any temporary disruption to water or power supplies caused by work activities is absolutely necessary the Contractor must warn the affected population at least 24 hours in advance and no disruption will last longer than 4 hours.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Road works	Apply provisions of TMP to maintenance activities.	TMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	**ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Land Use	All along the project road section	Livelihoods impacts	Monitoring of livelihoods restoration per the RAP	RAP	MPWT	Per RAP
	**ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**					
Flora and Fauna	All along the project road section	Vegetation clearance	No chemicals will be used to clear vegetation.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	Waste	Routine collection of garbage along the roadway, specifically in areas close to rivers and NPA.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	All along the project road section	General	Continue to apply pollution prevention measures as applied during the construction phase for maintenance activities.	CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Designated Sites	All along the project road section with special attention to Pho HiPhi	Poaching	Prohibit hunting and natural resource collecting by the road maintenance personnel and contractors when at work. To be communicated through induction and training to all personnel (employees and contractors).	BMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
	All along the project road section with special attention to Pho HiPhi	NPA Protection	A program to strengthen the management of Pho HiPhi is required in the longer term and reduce the current a potential future degradation of the site. However, such a program is beyond the scope of this Project and should be part of a provincial government and MonRE effort to provide better management of the NPA.	None	Provincial government and MoNRE	N/A
	**ESS8: Cultural Heritage**					
Cultural Heritage	All along the project road section	Impacts to Historical and archeological areas	In the event of any chance finds during the works procedures will apply that are governed by GoL legislation and guidelines and as outlined in the Contractors Chance Find Procedure.	Chance Find Procedure	Contractor	Obligation of the contractor covered under BOQ-OPBRC
	**ESS10: Stakeholder Engagement and Information Disclosure**					

Subject	Applicable locations	Potential Impact / Issue	Mitigation Measure	Implementation Plan	Responsibilities	Cost
Stakeholder Engagement	All along the project road section	General engagement	Per requirements of the Project SEP and EGEP	SEP & EGEP	Contractor	Obligation of the contractor covered under BOQ-OPBRC
Greivances	All along the project road section	Maintenance impacts	Continue to monitor and address grievances per the GRM.	GRM & CESMP	Contractor	Obligation of the contractor covered under BOQ-OPBRC

6. MONITORING PLAN

The overall objective of environmental and social monitoring is to qualitatively and quantitatively measure effectiveness of mitigation measures, and develop appropriate responses to incompliances with Project standards, and emerging environmental and social issues. A framework for monitoring activities and thresholds are provided in this chapter of ESMP to be further developed as more information becomes available before the onset of land preparation and construction phase. Monitoring will be carried out to ensure that all Project activities and mitigation measures comply with the Project standards, MPWT and the Construction Contractor meet their commitments and requirements of this ESMP in terms of periodical audits and reporting. The main objectives of developing a monitoring program and defining parameters are to;

- Control that all mitigation measures are in place,
- Measure effectiveness of the mitigation measures,
- Provide mechanisms for taking timely action when unexpected environmental and social incidents are encountered, and
- Identify training requirements at all levels of the organizational structure.

Roles and responsibilities, monitoring parameters, monitoring frequencies, and Project's monitoring requirements are required to be identified in implementation of the Monitoring Plan. To determine whether monitoring outcomes comply with the Project standards, implementation of mitigation measures will be observed and measured, effectiveness of measures will be verified, all results will be recorded and monitored.

Table 17: Environmental and Social Monitoring Plan

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
Design							
ESIA & ESMP	WB	N/A	Design Phase	Documentation	Decree on Environmental Impact Assessment (2019) ESS1	N/A	Funds already committed.
Climate change in design	ISWS	All Project areas	Design Phase	Documentation	Decree on Climate Change (2019) United Nations Framework Convention on Climate Change (UNFCCC 1995). ESS3	Design reviews reported to MPWT	Part of ISWS costs
Geohazard risks (including flooding	ISWS	**Landslide / erosion prone areas:** 81+400-81+500 96+865-96+935 98+330-98+370 108+035-108+165 108+733-108+827 108+940-108+961	Design Phase	Documentation	National Design Codes for Seismicity ESS3	Design reviews reported to MPWT	Part of ISWS costs

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
		121+886-121+914 122+850-122+950 128+860-128+990 129+708-129+743 **Flood prone areas:** 5+225 7+000 14+360 22+121 22+968 24+437 51+806 59+348 59+809 59+971 61+393 69+200 69+725					

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
		70+203 70+344 76+154 76+454 77+456 82+562 93+631 103+184 107+367					
Noise Consultations and adaptive measures	ISWS	All villages and sensitive receptors along the road	Design Phase	Documentation	National Noise quality standards ESS3 WBG EHS Noise guidelines	Reporting to MPWT	Dependent upon consultation findings
Traffic safety	ISWS	All Project areas	Design Phase	Documentation	ESS3	Design reviews reported to MPWT	Part of ISWS costs
Pre-construction Phase							
RAP	WB	All project areas	Pre-Cons.	Documentation	Decree #84 on Compensation and Resettlement of People Affected by Development Projects (2016) Technical Guidelines on Compensation and Resettlement of People	N/A	RAP Costs

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
					Affected By Development Project (2005) ESS5		
Stakeholder Engagement Activities	Per SEP Requirements	Per SEP specified locations	Pre-Cons.	Documentation	ESS10	Routine reporting per SEP requirements	Part of Project costs
Contract Documents	ISWS	N/A	Pre-Cons.	Contract documents	ESS1	Review of contract documents and reporting to MPWT	Part of ISWS costs
E&S Staff	WB	N/A	Pre-Cons.	Contract documents	ESS1	N/A	N/A
CESMP & Associated plans	ISWS	N/A	Pre-Cons.	Documentation	ESS1	CESMP review reports to MPWT	Part of ISWS costs
Permits	ISWS	All project areas	Pre-Cons.	Documentation	National Ambient Air Quality Standards ESS1 National requirements for water, air quality, EIA.	Permit review submitted to MPWT	Part of ISWS costs
Road side vendors	MPWT	Where roadside vendors are affected	Pre-Cons.	Documentation	ESS2	Reporting to WB	Part of Project costs
Access	ISWS	Temporary rotes and pathways	Pre-Cons.	Documentation	ESS2	Monthly reports	Part of Project costs
Induction Training	ISWS	All work sites	Pre-Cons.	Documentation	OHS Plan ESS2	Monthly reports	Part of Project costs

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
UXO Clearance	Contractor	All work sites	Pre-Cons.	Documentation	ESS2	Written reports to ISWS and MPWT	Obligation of the contractor covered under BOQ-OPBRC
GRM	ISWS	N/A	Pre-Cons.	Documentation	GRM ESS10	Review of documents and reporting to MPWT	Part of Project costs
Construction Phase							
Soil Contamination	Contractor	Gas stations (as identified during site inspections)	Pre-construction at identified sites	Soil sampling and analysis (by accredited and competent firms)	National soil quality standards Pollution Prevention Plan ESS3	Once, per site	Obligation of the contractor covered under BOQ-OPBRC
Noise (Leq)	Contractor	At baseline locations and at locations of complaints case of complaint	Monthly or when complaints are received from residents	Noise level measurements using handheld monitoring equipment	National Noise quality standards Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Vibration - PPV	Contractor	At sites identified by the CVMP	Continuously during works close to identified vibration sources	Own monitoring equipment	CVMP DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures Pollution Prevention Plan ESS3:	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Air emissions - NOx, SO2,	Contractor	At baseline locations and at locations of complaints	Monthly or when complaints are received from residents	AQ measurements using handheld monitoring equipment	National Ambient Air Quality Standards Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
PM10, PM2.5							
Wastewater	Contractor	Construction Site	Daily	Visual observations at site	WBG Indicative Values for Treated Sanitary Sewage Discharges Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Surface Water Quality	Contractor	At all bridge construction sites	Monthly during bridge construction works	Sampling and analysis (by accredited and competent firms)	National Surface Water Quality Standards Law on Water and Water Resources (2017) ESIA Project Standards PPP ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Camp discharge water	Contractor	Camp sites, batching plants, rock crushing plant	Monthly	Sampling and analysis (by accredited and competent firms)	WBG Indicative Values for Treated Sanitary Sewage Discharges Wastewater Effluent (General Industrial Wastewater Discharge) PPP ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Drinking water	Contractor	Construction camps	Monthly	Sampling and analysis (by accredited and competent firms)	National Drinking Water Quality Standards - Groundwater Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
Excavation Waste	Contractor	Project Route and Excavation Storage Areas	Continuously during excavations	Documentation and visual observations at site	Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Topsoil	Contractor	Project Route and Excavation Storage Areas	Continuously during excavations	Documentation and visual observations at site	Pollution Prevention Plan ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Solid Waste and Packaging Waste	Contractor	Project working areas during construction work	Daily	Documentation and visual observations at site	Pollution Prevention Plan National Waste Management Legislation ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Non-Hazardous and Inert Wastes	Contractor	Project working areas during construction work	Daily	Documentation and visual observations at site	Pollution Prevention Plan National Waste Management Legislation ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Hazardous Wastes	Contractor	Project working areas during construction work	Daily	Documentation and visual observations at site	Pollution Prevention Plan National Waste Management Legislation ESS3	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Fauna and flora species of high conservation concern	Contractor	All project working areas	Weekly, where site clearance is on-going	Visual inspections, pre-clearance surveys	Wildlife and Aquatic Law (2008) Forestry Law (20**19**) United Nations Convention on Biodiversity (CBD 1996	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
					Biodiversity Management Plan ESS6		
Storage and transportation of fuel, oil and hazardous materials	Contractor	Project working areas during construction work	Daily	Documentation and visual observations at site	ESS4 Emergency Response Plan Spill Response Plan	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Labor and Working Conditions	Contractor	All project working areas	Monthly	Documentation	Labour Law (2013) ESS2 Labour Management Plan OHS Plan	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
OHS Management	Contractor	All project working areas	Daily	Documentation, Training Records, HS Audits	Labour Law (2013) Decree on Occupational Safety and Health (2019) ESS2 Labour Management Plan OHS Plan	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC
Traffic (Transport) Management (number of complaints about traffic problems, number of traffic training	Contractor	Project working areas during construction work	Monthly	Documentation	ESS4 Community Health and Safety Plan	Monthly Monitoring Reports	Obligation of the contractor covered under BOQ-OPBRC

Parameter	Responsibility	Location	Frequency / Timing	Monitoring Method	Management Plan detailing Monitoring Requirements / Relevant Legislation - Standard	Reporting	Cost
provided to workers)							
PCR – management of grave relocation	Contractor	Beng cemetery	During grave removal	Observational	Law on National Heritage (2014) Decree on the Preservation of Cultural, Historical and Natural Heritage (1997) ESS8		
Operation							
Noise	Contractor	Baseline measurement points	Annually	Noise level measurements (by accredited and competent firms)	National Noise quality standards ESS3	Annual Reports	Obligation of the contractor covered under BOQ-OPBRC

Appendix A – ISWS ToR

The following outlines the specific tasks the Engineer is responsible for.

Review Environmental and Social, Health and Safety Instruments and compliance by the Contractor, including:

- The Engineer shall, when reviewing the Contractor documents and report especially those related to CESMP, as well as any other relevant plans (RAP, EGEP, SEP) and at the time of site visits during rehabilitation and maintenance phase, ensure that none of the safety and ESS regulations have been violated or otherwise ensure that appropriate measures are applied to prevent E&S, safety and security breaches resulting in impacts on environment or people and accidents (including to members of the
- public). The Engineers' review of ESS and safety issues shall include, but is not limited to:
- Assist the Client and work with local authorities to organize consultation events with residents/PAHs well ahead of the construction activities, as stipulated at the sub-project-level through respective RAPs, CESMPs and/or SEP and ensure that the work starts only once compensation has been made available;
- Review and verify the accuracy of all permits and clearances (e.g. Construction permit; Water rights; Environmental permits; Land availability; Land acquisition in accordance to the RAP; Right of way, UXO Clearance etc.) that have been obtained prior to construction in order to ensure completeness;
- Support MPWT in establishment and monitoring of functioning of the Grievance Redress Mechanism (GRM), consistent with the project's SEP, including the follow-up on the resolution of any complaints or grievances in relation to environmental and/or social matters. Review the ESMP, SEP and, when required, RAP after 6/12 months of implementation and amend them based on outcomes;
- Ensure that the CESMP reflects maintaining highest standards of pollution management and adhere to international standards on air, water, noise quality and vibration levels like those given in WBG EHS Guidelines;
- Ensure that the CESMP has reliable and wide-ranging baseline data collected and reported on water (surface and ground) and air quality, noise, and vibration levels likely to be impacted during the project construction works;
- Monitor and report on the implementation of the BMP;
- Approve after due revision the CESMP, SEP and, when required, RAP, during the execution of the works, instruct the Contractor to update the CESMP, SEP and, when required, RAP, if it becomes necessary;
- Supervise the contractor's implementation of the CESMP, SEP and, when required, RAP, and report on compliance of the contractor with the ESMP, CESMP, SEP and, when required, RAP, ESHS Works Requirements and LMP;
- Document Contractor's non-conformances, identify corrective actions and follow-up on correction/remediation;

- Check if the Contractor provides instructions and required trainings to workers, subcontractors and suppliers on the respective ESHS requirements, in line with the LMP and comply with it including, among others, prevention on SEA/SH.
- Review the Contractor's progress reports, and check if detected non-conformities are documented and analyzed and are addressed by corrective actions;
- Follow-up on the resolution of any complaints or grievances in relation to ESHS and Labor Management Plan (LMP);
- Inform the PMU on any ESHS related situation that might arise which could jeopardize the successful completion of the Project. Reflect such situations in the periodic reporting;
- Ensure that non-conformities are addressed through measures adapted to the severity of the situation;
- Undertake regular site visits to sub-project sites and workers camps for verifying the implementation of the specific E&S measure, including the verification of stakeholder engagement and provisions to prevent SEA/SH are in place, as well as ensuring that in the event of a noncompliance, agreed remedial actions are agreed to be applied and documented. Request the Contractor to remove any person employed on the site or works if the person persists in any conduct which is prejudicial to safety, health, in protection of environment or in the case of complaints of Sexual Exploitation and Abuse, sexual harassment, VAC.
- Re-act timely when seeing breaches with the safety regulations or when, in his own judgment, there is a prevailing event that may result in an accident, make timely and practicable recommendation on the spot;
- Stop the works if the way of execution is endangering the life or safety of any people;
- Organize and monitor the reporting of serious incidents and accidents and inform the Client as soon as practicable about any major accident;
- Monitoring, reporting and evaluation of the CESMP, SEP and RAPs implementation by contributing to the regular progress reports throughout the Project implementation phase;
- Undertake other actions related to ESHS aspects of the Project, in order to ensure full compliance of the Project with the provisions stipulated by the project's Labor Management Plan (LMP).

Review and Monitor Health and Safety Management Plans (HSMP) of the Contractors, including:

- Ensuring that contractors and workers signed the "Codes of Conduct" before mobilizing manpower and receive training on their COC shortly after mobilizing;
- Systematic identification of existing and new hazards on the works site;
- Minimization of significant hazards, where elimination and isolation are both impractical;
- Update method statements to describe and implement new work procedures as required to minimize hazards;

- Review the generic and site-specific traffic safety management plan prepared by contractors, taking into account safety of road users, resident along the road and workers and including considerations on temporary access to and from houses and road sides during the works;
- Ensure the provision and use of appropriate protection measures (PPE) and the availability for workers to be properly protected with safety supplies including, but not limited to, emergency kits with drugs and medicines, safety shoes, safety hats and appropriate protective clothing;
- Make sure that the construction works include have provisions in place consistent with the WB's interim note on "COVID-19 considerations in construction/civil works projects".
- And/or current Covid-19 measures mandated in Lao PDR.
- OHS induction training material and on-going training modules, as well as specialized trainings for hazardous activities (e.g. operation of heavy machinery, lifting);
- Ensure that the age of employment and the working conditions of the project workers comply with the project's LMP;
- Pre-determined and known to workers emergency procedures dealing with accidental spillage, pollution or imminent danger;
- Ensure regular review and assessment of each hazard identified and monitor employees' exposure to these hazards;
- Ensure that regular medical checks are done for workers and normal working hours are followed;
- Incident and accident reporting procedure and methodology for statistics compilation for occupational, community health and safety (OCHS) performance;
- Ensure reporting and recording of work site incidents so health and safety problems can be addressed quickly and regularly;
- Proper preventive signs significantly ahead of works zone for drivers to be informed of reduced speed and detours;
- Report to DoR/MPWT any significant issues related to Health and Safety; and
- Recommend sanctions in case of non-compliance with Environmental, Social Health and Safety (ESHS) measures.

Review the Emergency Procedures and Contingency Plan to be submitted by the Contractors to ensure the Plan at the least includes:

- An effective communication and event recording system;
- The name, contact number and specific duties of the Contractor's nominated Emergency Duty Officer who shall be fully authorized to respond to an emergency event 24/7;
- Availability of priority contact numbers in case of emergency, e.g. police, hospitals, ambulances, fire brigades and others as may be needed;
- Response procedures for emergency events including major climate events, road crashes during works, and seismic events;
- Possible detour routes in the event of road closure;

- Due consideration shall be made to minimize the potential negative impacts of the emergency works.

Supervise and Monitor Implementation of CESMP, including:

- Provide guidance, orientation and training to the Contractors during the development of the CESMP which shall be completed at least three months prior to the start of construction.
- Review the environmental and social instruments and develop a work plan and methodology to supervise and monitor the implementation of the CESMP and to be submitted and implemented by the Contractor, including key performance indicators to measure the compliance of the Contractor and efficiency of all mitigation and management measures;
- Review and approve the CESMP in order to be compliant with the (a) ESS requirements of the construction contracts as reflected in the project ESMP approved by WB, (b) the ECC approved by GOL, and (c) other ESS requirements as requested by WB;
- Review the Contractor's Management of Change (MoC) procedure to address environmental and social risks and impacts induced by changes in design, planning and other activities;
- Review the detailed design and work plan to be prepared by the Contractor to ensure that all operation areas, activities and material are generally considered in the CESMP and make recommendation for additional studies if required;
- Review ESHS risks and impacts of any design change proposals and the implications for compliance with the ESMP, consent/permits and other relevant ESS requirements for the Project;
- Conduct a due diligence of the borrow pits proposed for use by the Contractor to ensure that the borrow pits meet requirements set out in the ESMP;
- Before excavation works and removal of the existing pavement commences, review the re-utilization plan for removed material and undertake an inspection of and approve the contractors' disposal sites to ensure that the ESMP criteria for such sites are met;
- Review documentation, resolution and reporting of non-compliance issues and complaints. Supervise day-to-day implementation of the CESMP of the Contractor.
- Carry out periodic environmental quality monitoring, e.g. noise level, water quality, and air quality as agreed with the WB;
- Prepare Environmental and Social Monitoring and ESMP Implementation reports as required by the WB and/or GoL (per ESMP, IEE/EIA Procedures). As part of the report, document environmental and social issues and complaints and maintain a photographic record of sufficient quality and quantity of key issues identified and actions and timescales agreed upon for their resolution.
- Monitor and report on implementation of the BMP, specifically including the required surveys and measurements on biodiversity impacts and mitigation measures, following the intervals and details defined in the BMP;
- Review and monitor employment of local labors and communities, specifically women and ethnic minorities and working conditions during construction and ensure that core labor standards and code of conducts are followed and monitored during

implementation. This includes integrating necessary provisions in bidding documents and contracts to ensure that Project goals can be reached and indicators measured. Ensure that the Contractor complies with all applicable labor laws.

- Review and monitor all aspects of the establishment, reporting and operationalization of the Grievance Redress Mechanism (GRM);
- Ensure that the PAPs/PAHs are fully aware of the grievance redress procedure and the process of bringing their complaints, investigate the veracity of the complaints, and recommends actions/measures to settle them amicably, fairly and transparently before they go to the redress committee or the courts of law;
- Assist in establishing GRM for workers and monitor the labor working conditions and other rights in conformity with applicable Legislations and Funding Agencies' Social Policy; Coordinate and work closely in all of the ESS issues with EDPD/PTI of MPWT and the DPWTs, the Project Resettlement Committee (PRC), and local authorities of the project Provinces.
- It is recommended that the Engineers supports the Contractor's ESM through on the job training in the preparation of the CESMP.

Staff Requirements

Position	Tasks	Required Qualifications
Senior Environmental Safeguards Specialist (SESS) –Part time	The SESS will be engaged on a part-time basis, with approx. 4 months during the first year of construction and 2 months per year for the second and the third year. During the construction phase the SESS will prepare a detailed action plan including environmental and social monitoring checklists to be completed by the ESS to ensure that the Environmental and Social Management System is established, implemented, maintained, the performance of which to be monitored by the SESS. He/she will address all environmental and social issues during construction. He/she will also conduct environmental and social training and briefings to provide environmental awareness on World Bank ESF and the government environmental safeguards policies, requirements and standard operating procedures in conformity with the government's regulations and international practice; ensure monitoring and reporting of Contractor's compliance with contractual environmental and social mitigation measures during the assignment. The SESS will review and advise the relevant persons (of the ISWS) on the ESHS risks and impacts of any design change proposals and the implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements. The SESS will also help with the development and review of the Contractors Site Specific CESMP. The SESS will prepare Quarterly Environmental Reports providing details of the Contractors activities (such as training programs, community meetings) and compliance with the ESMP and CESMP. The SESS will conduct a due diligence of the borrow pits proposed for use by contractor/provide advice to the ESS and Occupational Health and Safety Specialist (OHSS) in conducting the due diligence to ensure that the borrow pits meet requirements set out in the ESMP. Tasks: • Provide supports to the Team Leader or Senior Resident Engineer(s), lead supervision of environmental and social tasks, and provide guidance to the ESS and OHSS to ensure contractors compliances to the project ESMP	• Degree in environmental sciences or equivalent; • Preferably 10 years' experience in ESIA preparation, implementation, supervision and monitoring of projects including roads/highway projects funded by International Financial Institutions; • 8 years' international experience; • Ability to effectively communicate and produce reports and documents in English of acceptable quality; • Experience in Southeast Asian countries would be an advantage; • Leadership, organizational and interpersonal skills. • Fluency in written and spoken English is mandatory.

Position	Tasks	Required Qualifications
	• Prepare a detailed action plan including environmental and social monitoring checklists to be completed jointly by the ESS and OHSS to ensure that the Environmental and Social Management System is established, implemented, maintained and will monitor its performance; • Help with the development and review of the Contractors CESMP; • Conduct a due diligence of the borrow pits proposed for use by the contractor or guide the ESS and OHSS in conducting the due diligence to ensure that the borrow pits meet requirements set out in Project's ESMPs; • Ensure baseline monitoring and reporting of Contractor's compliance with contractual environmental and social mitigation measures during the assignment; • Undertake audits and inspections of Contractor's accident logs, community liaison records, monitoring findings and other ESHS related documentation, as necessary, to confirm the Contractor's compliance with ESHS requirements; • Review and advise the relevant person (of the ISWS) on the ESHS risks and impacts of any design change proposals and the implications for compliance with the Project ESIA, ESMP, consent/permits and other relevant project requirements; • Agree remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ESHS obligations; • Check that the Contractor's actual reporting (content and timeliness) is in accordance with the Contractor's contractual obligations; • Review and comment, in a timely manner, the Contractor's ESHS documentation (including regular reports and incident reports) submitted to the Engineer and to provide advice to ensure the accuracy and efficacy of the documentation; and • Prepare quarterly reports that describe the work that the Engineer's ESS & OHSS have undertaken, the issues (including any Contractor's ESHS noncompliance, details of the Contractors activities (such as training programs, community meetings) and compliance with the ESMP and CESMP, and identified issues and the actions taken to address such issues.	

Position	Tasks	Required Qualifications
	• Provide specific advice and training to the ESSS, field engineers of DPWT, and key • staff of local authorities and communities responsible for planning and implementation of the CESMP and key parameters for monitoring. There are no specific tasks for the SESS during O&M.	
Senior Social and Resettlement Specialist	The SSRS will be a full-time position during of the pre-construction period until completion of implementation of RAP and EGEP, then with short-term inputs are needed. The consultant will provide technical and management support to EDPD/PTI to carry out the following tasks: • Technical lead in assisting the PMU, EDPD/PTI to develop RAP and EGEP Implementation Work Plan, tracking system, and to monitor achievement of milestones in the Work Plan. This Work Plan will also include any additional resettlement impacts caused by the detailed design and relocation of public utilities; • Preparation and submission of inception report, progress reports and RAP completion report to the PMU and EṢD/PTI and the World Bank for review and approval; • Communication with and report to the PMU and ESD/PTI safeguard focal points and World Bank task team, over the course of RAP and EGEP implementation to seek advice and support to RAP and EGEP implementation; • Work with concerned government agencies including MONRE and its local offices, EDPD/PTI, DPWT/OPWT and other concerned agencies and teams assigned from the ministries and the project provinces, to successfully implement RAP and EGEP; • Assist PMU and ESD/PTI safeguard focal points to establish and implement simple IT-based tracking system including tracking of the grievances in the GRM database; • Conduct regular site visits to: a) monitor RAP implementation, compensation, replacement of assets lost (construction of new structures); b) livelihood and income restoration support. Preparation and submission of ESS monitoring report including the status of grievance received and addressed, managing the schedule and tasks of national social consultants; • Through site and off-site monitoring, monitor LMP, SEA/SH and SEP implementation.	• A minimum of Master Degree in a relevant social science or other relevant field; • A minimum of 10 years of experience in the management and monitoring of resettlement for Infrastructure, experiences related to road construction will be a plus • Good knowledge of MDBs, specifically World Bank, ESF, specifically ESS5 and ESS7and relevant national legislation; • An understanding of Laos legislation such as Decree 84, 2016 on compensation and resettlement, MONRE's Instructions on ESIA and IEE, 2016, Land Law 2003 would be advantageous but is not essential • Ability to effectively communicate and produce reports and documents in English of good quality; • Leadership, organizational and good interpersonal skills;

Position	Tasks	Required Qualifications
	There are no specific tasks during O&M.	• Fluency in written and spoken English is mandatory.
Road Safety Specialist (RSS)	• Review the detailed engineering designs with focus on road safety issues; • Review the road safety audit report (RSA) of the detailed designs to see if RSA's • recommendations for safety improvement have been adequately incorporated; • During the construction, monitor the contractors' implementation of the traffic management plans (TMP) and advise the contractors' performance with focus on road safety; • Assist the Department of Transport (DOT), Traffic Police and Department of Public Works and Transport of provinces (DPWT) and Office of Public Works and • Transport of districts (OPWT) along project road to establish and implement a road safety awareness program for the road.	• Bachelor degree in highway/civil engineering (preferably road safety subject); • Shall have a minimum of 10 years experiences in road design or road safety audits; • Fluency in written and spoken English is mandatory.
Environmental Safeguards Specialist (ESS)	• Establish and maintain close coordination with DPWT, local authorities, and local community and support the Team Leader and the consultant team implement the ES activities during supervision and monitoring, and conduct them under remote guidance of the SESS and SSRS when they are not on site; • Supervise the contractors' compliance to CESMPs and complete detailed action plan including environmental monitoring checklists prepared by the SESS; • Under the supervision of SES, design and implement training plan on ESMP and CESMP implementation, environmental awareness, and other aspects; • Review all documents and reports regarding the integration of environmental safeguards including the CESMPs and other contractor's environmental action plans; • Conduct a due diligence of the borrow pits proposed for use by contractor to ensure that the borrow pits meet requirements set out in the ESMPs; • Undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with the	• Degree in environmental sciences or equivalent; • Preferably 5 years' experience in conducting environmental impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures during implementation of projects including highway projects funded by developing partners. • Knowledge on the IFI's (WB, EIB, AIIB) safeguard policies and relevant national legislation such as Ministry of Natural Resources

Position	Tasks	Required Qualifications
	CESMP requirements, with and without contractor and/or client relevant representatives, as necessary, but not less than once per month. ESS to monitor the Contractor's implementation of their CESMP via weekly inspections of the Contractors camps and work sites. Specific attention will be given to ensure safety of workers and local communities; • Prepare monthly compliance reports; and • Provide support to the SESS, SSRS, OHSS and Team leader and Senior Resident Engineer(s) to ensure compliance to the project ESMP requirements. There are no specific tasks during O&M.	and the Environment's (MONRE) Instructions on ESIA and IEE, 2016 • Ability to effectively communicate and produce reports and documents in Lao and English; • Organizational and interpersonal skill with cultural sensitivity; • Fluency in written and spoken Lao. • Fluency in written and spoken English is mandatory.

Position	Tasks	Required Qualifications
Social Safeguards Specialist (SSS)	• Establish and maintain close coordination with DPWT, local authorities, and local community and support the Team Leader and the consultant team implement the SS activities during supervision and monitoring, and conduct them under remote guidance of the SSSS and RSS when they are not on site; • Supervise the contractors' compliance to ESMPs / CESMPs and complete detailed action plan including social monitoring checklists prepared by the SSRS; • Under the supervision of SSRS, design and implement training plan on RAP, EGEP, LMP and GRM implementation, and other SS aspects; • Review all documents and reports regarding the integration of social safeguard including the C-ESMPs and other contractor's social action plans as LMP; • Undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with the C-ESMP requirements, with and without contractor and/or client relevant representatives, as necessary, but not less than once per month. SSS to monitor the Contractor's implementation of their CESMPs via weekly inspections of the Contractors camps and work sites. Specific attention will be given to ensure safety of workers and local communities; • Prepare monthly compliance reports; and • Provide support to the SESS, RSS, SSRS, and OHSS, Team Leader and Senior Resident Engineer(s) to ensure compliance to the project ESMP requirements. There are no specific tasks during O&M.	• Degree in Social sciences or equivalent; • Preferably 5 years' experience in conducting social impact assessments and implementation of social mitigation plans and/or monitoring implementation of social mitigation measures during implementation of projects including highway projects funded by developing partners. • Knowledge on the IFI's (WB, EIB, AIIB) safeguard policies and relevant national legislation such as instructions on resettlement and compensations. • Ability to effectively communicate and produce reports and documents in Lao and English; • Organizational and interpersonal skill with cultural sensitivity; • Fluency in written and spoken Lao. • Fluency in written and spoken English is mandatory.

Position	Tasks	Required Qualifications
Sexual Exploitation and Abuse Specialist / Sexual Harassment Specialist	• Establish and maintain close coordination with contractor and local community and support the Team Leader and the consultant team implement the SEA/SH activities during supervision and monitoring, and conduct them under remote guidance of the SSRS and RSS when they are not on site; • Supervise the contractors' compliance to ESMPs / CESMPs with regards to SEA/SH, Code of Conduct and complete detailed action plan including SEA/SH monitoring checklists prepared by the SSSS; • Under the supervision of SSRS, design and implement training plans on SEA and SH; • Review all documents and reports regarding the integration of SEA/SH including the C-ESMPs and other contractor's social action plans as LMP; • Undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with the LPM and SEA/SH obligations, with and without contractor and/or client • relevant representatives, as necessary. SSS to monitor the Contractor's implementation of their LMP and SEA/SH action plans via regular inspections of the Contractors camps and visits to local communities. • Prepare monthly compliance reports; and • Provide support to the SESS, SSRS, RSS, and OHSS and Team leader and Senior Resident Engineer(s) to ensure compliance to the project ESMP LMP requirements. There are no specific tasks during O&M.	• Degree in Social sciences or equivalent; • Preferably 5 years' experience in conducting Sexual Exploitation assessments and studies or implementation of mitigation plans and/or monitoring implementation of Sexual harassment mitigation • measures during implementation of projects including highway projects funded by developing partners. • Knowledge on the IFI's (WB, EIB, AIIB) safeguard policies and relevant national legislation such as instructions on resettlement and compensations. • Ability to effectively communicate and produce reports and documents in Lao and English; • Organizational and interpersonal skill with cultural sensitivity; • Fluency in written and spoken Lao. • Fluency in written and spoken English is mandatory.

Position	Tasks	Required Qualifications
Occupational Health and Safety Specialist (OHSS)	• Help prepare the Health and Safety Management Plans (HSMP) which forms part of the Contractors overarching CESMPs; • Prepare health and safety monitoring checklists to ensure that the HSMP is implemented and maintained throughout the contract period; • Take care of all ESHS issues during construction works including conducting ESHS training and daily toolbox briefings to provide ESHS awareness; • In coordination with SESS and SSES, undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with the CESMP requirements, with and without contractor and/or client relevant representatives, as necessary, but not less than once per month. Specific attention will be given to ensure compliance with the project Occupational and Community Health and Safety (OCHS) requirements; • Review and advise the relevant persons (of the ISWS) on the OCHS risks and impacts of any design change proposals and the implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements; • As part of the ISWS quarterly report, prepare Quarterly OCHS section providing a summary of the reporting periods monitoring checklists, incident and accident reports, non-compliance reports, training programs, etc; and • Assist Team Leader on leading all OHS accident/incident reporting, responding, investigation and monitoring.	• A relevant, recognized OHS qualification, such as NEBOSH / IOSH / OSHA or other regionally recognized qualification or degree in occupational health and safety, public health or related field; • Preferably 5 years' experience as an OHS practitioner during implementation of infrastructure projects including road/highway projects; • Experience in road projects funded by International Financial Institutions would be an advantage; • Fluency in written and spoken English is mandatory. • Ability to effectively communicate and produce reports and documents in English; • Organizational and interpersonal skill with cultural sensitivity. • Fluency in written and spoken English is mandatory.